Participant Toolkit

Offshore Wind Youth Action Program

NEW YORK STATE OF OPPORTUNITY. | NYSERDA

Credit: MHI Vestas Offshore Wind

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What is offshore wind?

Welcome to the Offshore Wind Youth Action Program

Welcome to the Offshore Wind Youth Action program (OWYA, pronounced “Oh-Yeah”). Across New York State, curious young people like you are starting a journey to learn more about offshore wind because they care about climate change and clean energy, and how both will impact their futures.

Want to know who else is participating in the OWYA program? You are young people learning with a class, a club, a community group, your family, or even independently. Some of you are brand new to the topic of **climate change** while others may already be familiar with ways we can stop it, like switching to clean sources of energy. No matter where you are starting, we’re excited that you’re here with us to learn about offshore wind. Throughout this program, you will use social media and hashtags to connect with peers across New York State. **Use #OWYA on your favorite apps to see what others who care about climate change and clean energy are up to and share your learnings.**

Some basics to start the conversation:

What is climate change? Climate change describes the increase in the world’s average temperature over time due, mostly, to the burning of fossil fuels, like coal, oil, and gas, for energy.*

What is clean energy? Clean energy describes methods of turning natural resources that won’t run out — like sunshine and wind — into electricity while minimizing negative impacts to our health and the environment.*

**We’ll learn more about these concepts later in this lesson!*

WHAT IS OWYA?

OWYA is an educational program created by **NYSERDA**, short for New York State Energy Research and Development Authority. NYSERDA helps bring clean energy projects to New York. NYSERDA created OWYA to empower young people across New York State to learn about offshore wind as a tool to protect our planet from climate change and to get involved in the creation of clean energy in our communities. You’ll learn a lot in these lessons and by the end, we hope you’ll be excited about clean energy, and specifically offshore wind.

Excited to jump in? Follow these inspiring climate change social media accounts: @climemechange, @lonelywhale, @chicksforclimate, @intersectionalenvironmentalist, @climatetown

Credit: Javier Trueba

OWYA is made up of **three interactive lessons** for you to complete with a group and a facilitator or by yourself, but we think you'll enjoy it most in a group setting where you can explore the lessons together. Over the course of OWYA, we will answer three questions:

Lesson 1
WHAT IS OFFSHORE WIND?

Lesson 2
HOW DOES OFFSHORE WIND RELATE TO MY COMMUNITY AND ME

Lesson 3
HOW CAN I GET INVOLVED IN OFFSHORE WIND IN NEW YORK STATE?

The lessons are designed to be explored in order, starting with Lesson 1, followed by Lesson 2, and ending with Lesson 3. Each lesson builds on the previous one and asks you to **connect offshore wind to your own values and life**, ending with your **plan toward future action**. That could mean simply telling your family about what you've learned or even planning for your future career as an offshore wind professional. No matter what your next steps are, you are off to a great start — you are here with us, ready to learn, and that's already one of the most important actions you can take.

Throughout the OWYA program, there will be links to resources such as interactive websites, videos, infographics, and more that will help you to dive deeper into specific topics.

WHY IS OWYA IMPORTANT? WHY NOW?

The threats of climate change are real, immediate, and have big impacts for your generation and New York State. Clean energy presents one of many opportunities to significantly slow down climate change, create a healthier future, and create lots of job and educational opportunities for young people like you. New York State has laws that prove we are serious about fighting climate change. The 2019 Climate Act* challenges New York State to significantly reduce our carbon footprint, change the way that we power our communities, and make sure that the benefits from clean energy are shared by all.

Clean energy is a critical ingredient in our work to address climate change, and the stakes have never been higher. Scientists have called for all major countries to significantly reduce their carbon emissions by 2030 to avoid the most catastrophic effects of climate change. OWYA will introduce you to one of the most important ways that New York State is combating climate change and building a better future: clean energy from offshore wind.

**The long name for the law is the Climate Leadership and Community Protection Act (CLCPA), and you'll learn in Lesson 2 of OWYA why it's a pretty big deal.*

GO ONLINE **Click here to hear from youth around the world who are taking action on climate change in their communities.**

ACTIVITY: OWYA ICE BREAKER

Summary: Get to know your fellow OWYA participants by filling out an ice breaker about yourself, your community, and what you're looking forward to during OWYA. Then, share it with others!
Materials: Printed ice breaker forms (below), or computers to fill out the pdf digitally.
Prep Time: 10 minutes
Activity Time: 15 minutes

1. Fill out the form below with your own words or phrases (you can print out this or fill out the PDF).

   My name is _____. The places I call home are _____. The people I call my community are _____. What draws me to OWYA is _____.

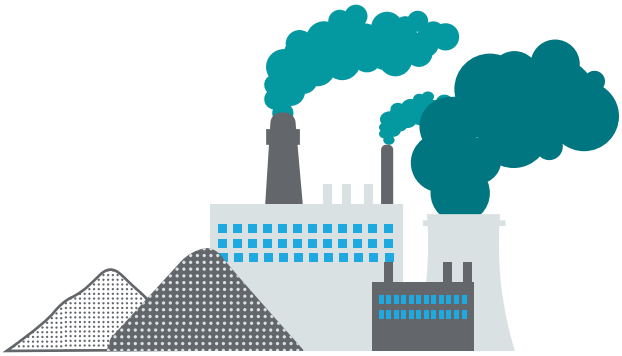
   One fact I know about climate change is _____.

   By the end of the OWYA program, I hope to [learn/accomplish] _____.

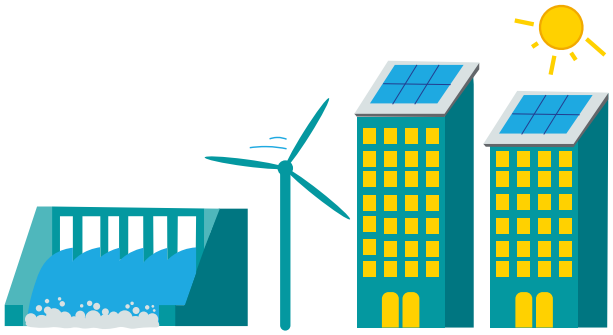
2. Break into pairs and read your ice breaker form to your partner.
3. Come together as a group and be prepared to share out about your partner, who they are, and what brings them to OWYA.
4. As a group, discuss what you've heard from each other. What makes this community of participants unique? What do you have in common? How can you challenge each other?
5. Share your answer to, "What draws me to OWYA is..." as a social media post. Use the social media accounts listed on page 7 as an inspiration and get creative with yours. For example, try creating a meme or GIF. Vote on the best social media post in your class.

Where to begin? Let's talk about clean energy

We interact with energy in countless ways every day — it powers everything from the lights in our homes to our phones and computers. **Take a moment right now to look around and count everything that is currently using energy.** Did you consider the music playing, the chargers plugged into walls, and the heating and cooling systems? What about the streetlights outside? The cars driving by? The energy required to make the furniture and products you are using? All of this energy comes from a source. Water, wind, the sun, wood, nuclear reactions, and gas and coal from beneath the Earth's surface are some of the main energy sources used to create the electricity that powers our lives. But not all energy sources are made equal. It's critical to choose which energy sources we use wisely because each source has its own level of impact on environmental and human health. We can group most energy sources into two main categories: **non-renewable** and **renewable**.



Non-renewable energy sources, like coal, oil, and natural gas are called "non-renewable" because they exist in limited supply on the earth and can eventually be used up entirely. Oil is used primarily to fuel our cars, buses, and airplanes, while coal, natural gas, and, in some cases oil, are used to create electricity and heat our homes. Most of these resources exist deep below the Earth's surface. To get to these resources, we use processes that may have negative impacts on the environment.



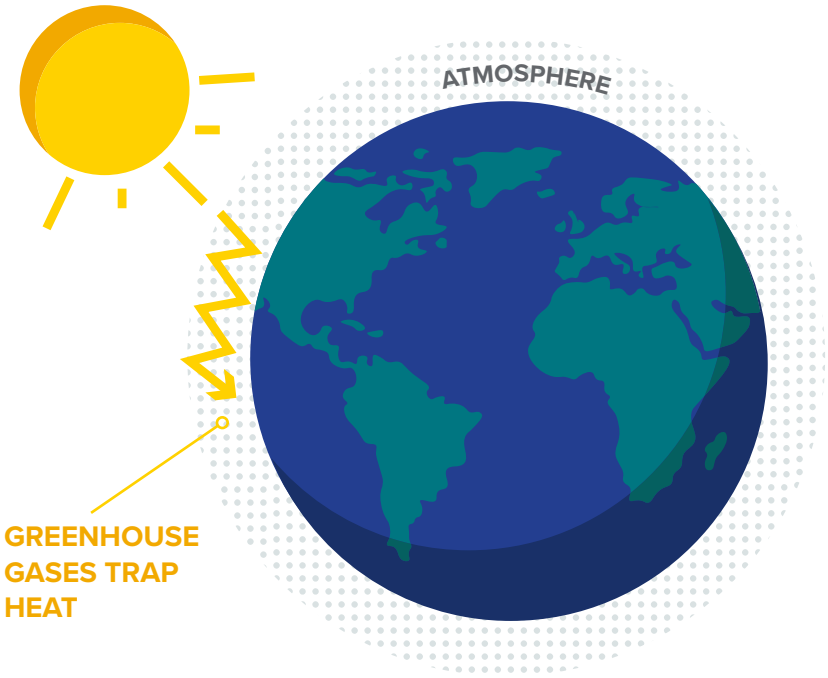
Renewable energy sources, such as solar energy from the sun and wind, replenish themselves naturally.[1] In other words, the sun and wind will not run out. When we power our communities with renewable energy sources like wind, solar, and water, we build systems that are healthier for our planet and our neighbors.

What are the health benefits of renewable energy? The air and water pollution created from non-renewable energy sources can lead to a wide array of health problems for people ranging from breathing issues to neurological damage, heart attacks, cancer, and premature death. Using renewable energy, including offshore wind, leads to less pollution and better health outcomes.[2]

GO ONLINE

Which energy sources are renewable vs. non-renewable? Play this game and test your knowledge and try out this science lesson.

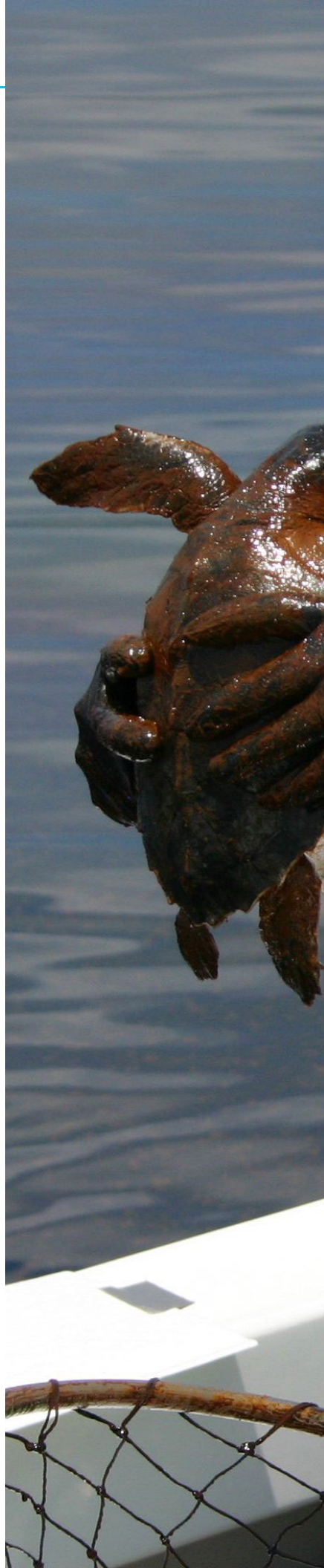
How do these two types of energy sources impact our environment? Non-renewable energy sources have a variety of negative impacts on the environment. Raw materials, such as coal, oil, and gas, are extracted from deep in the ground, and the ways we get them out, like drilling, can damage the surrounding environment and cause air and water pollution. Then, the resources are burned to release energy that can be converted to a usable form. Burning emits gases, and that's the big problem. Some of these gases, such as **carbon dioxide** and **methane**, are released in large quantities and get stuck in our atmosphere, acting like a blanket that wraps around the earth and traps heat from the sun. This heat-trapping process is called the **greenhouse effect**. This is the process that warms our planet and drives climate change. Additionally, the gases released from the burning of **fossil fuels** for energy can create hazardous air pollution that negatively impacts our environment, wildlife, and people.[3,4] Lastly, accidents associated with fossil fuel production, such as oil spills or gas leaks, can destroy entire ecosystems and the livelihoods of those who depend on them.



By contrast, renewable energy sources have a much smaller impact on the environment. Capturing energy from the sun and wind with solar panels and wind turbines is a clean process, with no harmful fuels needed during operation, leaving us with healthier air quality and communities.

GO ONLINE

Want to learn more about fossil fuels? Check out this video that explains what they are and why they're a problem for the environment. Learn more about greenhouse gases and how they contribute to climate change through postcards created with students in New York. Finally, use this carbon footprint calculator to determine the carbon emissions from your lifestyle choices.



OIL SPILLS, LIKE THIS ONE IN GULF OF MEXICO, CAN HAVE CATASTROPHIC IMPACTS ON MARINE AND COASTAL ECOSYSTEMS AND THE PEOPLE THAT DEPEND ON THEM FOR FOOD AND WORK

Credit: NOAA's National Ocean Service

You've heard of climate change before, but what does it actually mean?

HOW DOES IT IMPACT US? WHY SHOULD WE CARE?

Climate change describes the gradual warming of the earth's climate over time, and the changes in environmental processes and weather patterns that come with it. There are many reasons why the Earth's climate is changing, but scientists agree that human activities, such as the burning of fossil fuels for electricity and transportation, are causing the climate to warm at a much faster rate than ever before in the Earth's history.[5] An increase in temperature of one or two degrees might not seem like a big deal in our everyday lives, but this slight increase in global temperature results in dramatic environmental consequences that impact all of us. Because we are already feeling the effects of climate change (see *"What do the impacts of climate change look and feel like for an average New Yorker?"* on page 15-16), it's important that we act to slow down the warming process and adapt to the environmental changes that are already underway. This will make sure that our communities and ecosystems can bounce back from major climate disruptions like floods or droughts.

The ability for both human and natural systems to withstand and bounce back from climate impacts is called **resilience**. Making changes to our lives and surroundings to prepare for climate change and become more resilient is called **adaptation**. Climate adaptation can take many forms. For example, communities can create plans to prepare themselves for future disruptions like hurricanes, or architects and urban planners can create green spaces in our cities to absorb water from flooding. The act of slowing down climate change by reducing greenhouse gas emissions, through solutions like offshore wind, is called **mitigation**. We will need resilience, adaptation, and mitigation to solve the climate crisis and keep our communities safe.

GO ONLINE

Watch these videos that: breaks down climate change, explains the difference between weather and climate, and proves what youth can do to stop climate change.

WHAT DO THE IMPACTS OF CLIMATE CHANGE LOOK AND FEEL LIKE FOR AN AVERAGE NEW YORKER?

Rising temperatures: Climate change has caused global temperatures to rise at an increasing pace. Scientists started recording global temperatures in 1880. They have found that the 19 warmest years between 1880 and 2021 all occurred after 2000.[6] This means more hot days and heat waves, more allergens and harmful pollutants in the air, and negative health impacts like heat stroke and asthma.

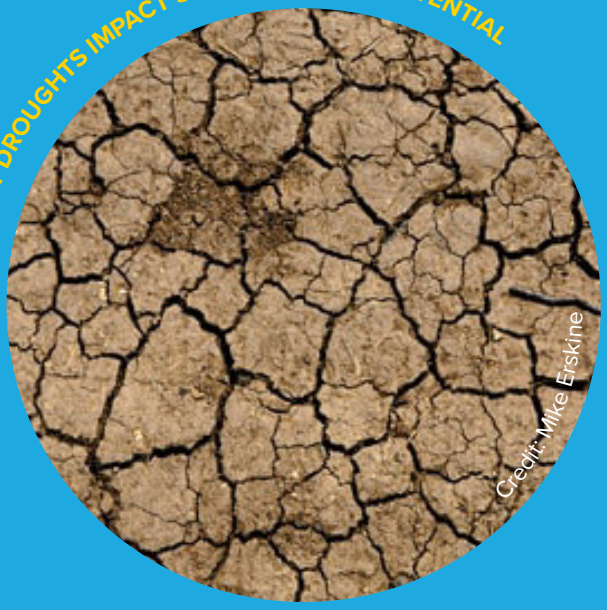
With rising average temperatures, young people who suffer from asthma might miss more school, have higher medical bills, and need their caregivers to miss more work in order to take care of them. On hotter days, more energy is used to cool homes and businesses, which means a higher demand for electricity. High electricity demand on particularly hot days can lead to power outages, or blackouts, if electrical equipment melts or fails or, in rare cases, there is a supply shortage.

Rising sea levels: Warmer global temperatures cause sea levels to rise due to melting polar ice caps and the natural dynamic of water to expand when it gets warmer. Sea level rise (SLR) can cause flooding in places we've never seen before across New York State. You may have seen new flooding of homes, businesses, and important infrastructure if you live in New York City or Long Island.

Flooding can harm local economies and, as it gets more severe, displace entire communities. Without adaptation or mitigation measures, SLR can mean less access to your local waterfront where many people live, work, and play. SLR can also impact drinking water that comes from underground aquifers, like those found on Long Island, if saltwater contaminates those important drinking water sources, making them undrinkable.

Rising sea levels can also change aquatic habitats themselves, as salty sea water intrudes into freshwater areas. For example, the Hudson River, which connects to the ocean, will get saltier farther north, potentially changing the plant and animal communities that are found along the river. In Lower Manhattan, the sea level has risen by nearly nine inches since 1950![7,8]

MORE FREQUENT DROUGHTS IMPACT SOIL'S GROWING POTENTIAL



Credit: Mike Erskine

BIG STORMS CAUSE MAJOR DESTRUCTION TO HOMES AND BUSINESSES

Changes in agricultural growing patterns and seasons: Climate change creates unusual weather patterns. We may see the impacts of shifting growing seasons at our grocery stores, farmers markets, and dinner tables. Extreme heat, drought, floods, and even unexpected frosts can impact farming seasons and the kind of food we can grow and enjoy in our state. Hotter temperatures can increase the costs of agriculture for our state's farmers by increasing cooling costs for barns and temperature — controlled manufacturing facilities like dairies.[9]

Bigger and more frequent storms: Warmer temperatures also make storms and hurricanes more intense and more frequent, threatening communities around the state. In October 2012, New York and surrounding areas were struck by Superstorm Sandy, one of the most damaging and costly storms in United States history. Many people lost their homes, and many years later, some communities are still recovering.

In addition to hurricanes, heavier and more frequent rain and snow storms can cause pollution and sewage to run off into local bodies of water, threatening ecosystems and human health.

GO ONLINE

Explore this map showing the areas most vulnerable to flooding from seal level rise and storm surge and this simulation that show how key climate indicators are changing.

The Impacts of Climate Change Across the World: In addition to what we're seeing in New York, people around the world are experiencing a wide range of impacts due to warmer global temperatures and changing weather patterns. In 2020, California and Australia set records for the most wildfires in one year, burning over 4 million acres of land in California and over 46 million acres in Australia.[10,11] Meanwhile, in South Africa, drinking water supply has been declining since 2015 due to extended periods of drought.[12]

Want to learn more about climate and clean energy action that you could be a part of? Follow these organizations and youth leaders on social media to keep up with their work! Tag your fellow OWYA participants in your favorite posts with #OWYA.

- **The Sunrise Movement** is a youth-led movement to fight climate change and create high-quality jobs with hundreds of local action hubs across the country, dozens of which are located in New York State.
- **Earth Uprising** is a youth-led climate action movement with networks across the globe.
- **Fridays for Future** began with Swedish activist Greta Thunberg's school strike for climate and is now an international movement calling attention to the climate crisis and pressure global leaders to take action.
- **Students for Climate Action (S4CA)** is a youth climate action committee that mobilizes elected officials to act on climate change.
- **Xiye Bastida** is one of the lead organizers of Fridays for Future. Follow Xiye @xiyebastida and @xiyebeara.
- **Vic Barrett** is a New York-based climate activist who has spoken at the COP21 U.N. Conference on Climate Change and at the U.N. headquarters in New York City. Follow Vic @vict_barrett and @vicbarett_.
- **Alexandria Villaseñor** is the founder of Earth Uprising and organizer of Fridays For Future. Follow Alexandria @AlexandriaV2005 and @alexandriav2005.
- **Jamie Margolin** is a co-founder of Zero Hour. Follow Jamie @Jamie_Margolin and @jame_s_margolin.
- **Greta Thunberg** is an internationally-famous climate activist challenging world leaders. Follow Greta @GretaThunberg and @gretathunberg.
- **Kevin J. Patel** is the founder OneUpAction. Follow Kevin @imkevinjpatel and @imkevinjpatel.

ACTIVITY: CLIMATE IMPACTS

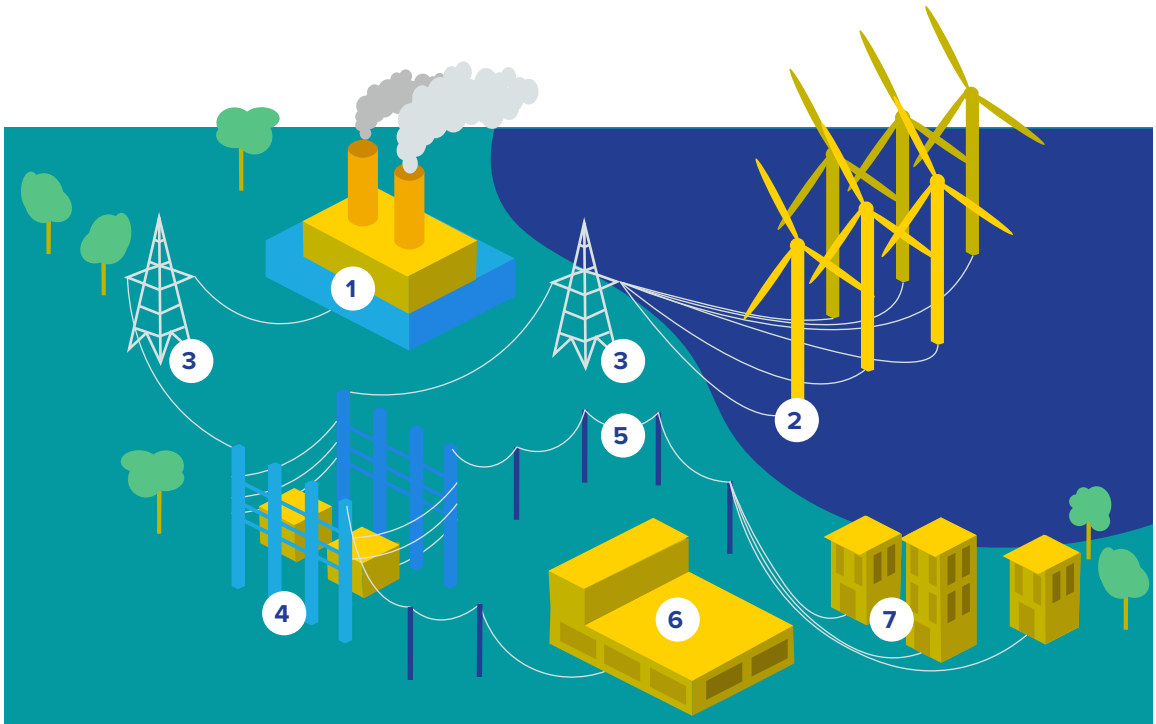
Summary: Identify local and global climate impacts through a review of various news sources.
Materials: Computers to access online news sources
Prep Time: 10 minutes
Activity Time: 30 minutes-1 hour

1. Search for articles about climate change in local, national, and international newspapers and science magazines. Collect several articles from a variety of news outlets and review what you find.
2. You can also check out climate-focused news sources like climatechangenews.com and climatecentral.org. What do these sources tell you about climate impacts in your community, versus other communities around the world?
3. Based on what you've read, what climate impacts seem to be most prevalent in New York? Do these match the impacts listed on pages 15-16? What climate impacts do we not experience locally that other places around the world face?
4. Write down some of your findings and share them with the rest of your OWYA group. After listening to others' findings, were there any climate impacts that you didn't consider?
5. What does this research reveal about how climate change affects areas around the world differently? Were you surprised by any of the impacts you read about?

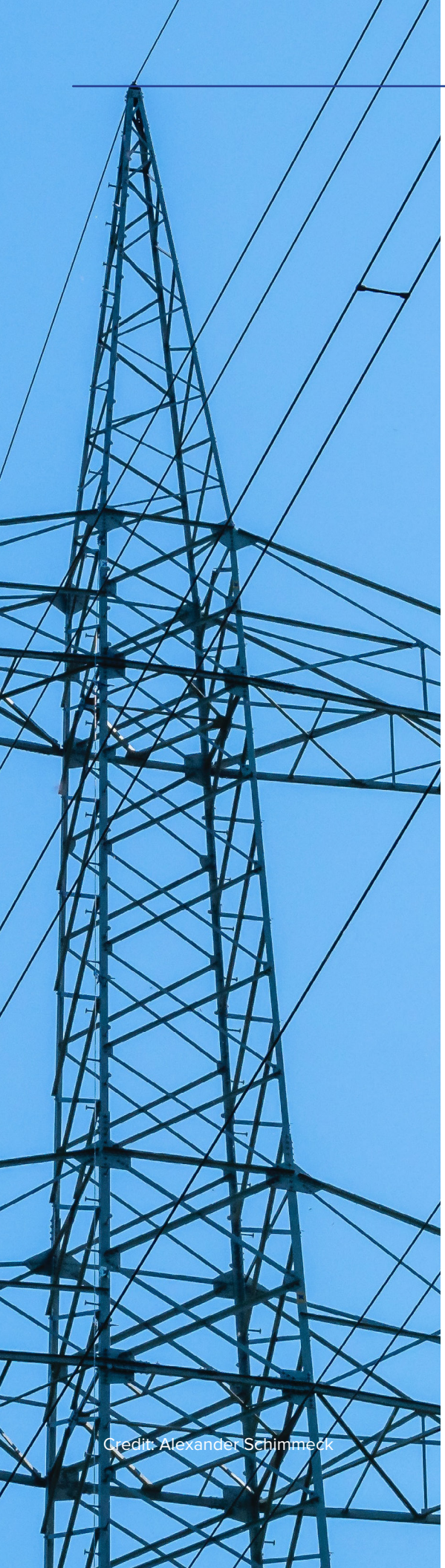
Create a meme and share with your cohort responding to the prompt: "Climate change got me like..." #OWYA (Share on your page or create a group page with your facilitator.)

Let's explore how renewable and non-renewable energy sources are converted into the electricity that heats our homes, powers our light bulbs, and charges our phones. **Let's start with the basics: electricity is generated from various energy sources through the use of a spinning turbine.**[13]

Non-renewable resources, like coal and gas that are extracted from the earth, are burned to heat water and create steam. The steam spins a turbine, which generates electricity. Similarly, wind is converted to electrical power by spinning a wind turbine. Generated electricity is then channeled through a complex network of power lines and power stations known as "the grid" to deliver power to our homes, schools, and businesses.



1. **Conventional energy generation:** Electricity produced from non-renewable resources, such as oil, natural gas, and coal.
2. **Renewable energy generation:** Electricity produced from renewable technologies, such as wind, solar, and hydroelectric.
3. **Transmission:** A network of high-voltage transmission lines carries electricity long distances across our State.
4. **Substation:** Local substations transform high-voltage power that comes through transmission lines into lower voltage power ready for consumers.
5. **Distribution:** Electricity is delivered to consumers through a network of distribution lines.
6. **Industrial Consumers:** Large electricity consumers, such as manufacturing facilities.
7. **Commercial/Residential Consumers:** Businesses and homes that use electricity.



Credit: Alexander Schimmeck

Renewable energy, or what is sometimes called clean energy, just makes sense. Across the country (and the world), there have been many new innovations in technology, policy, and partnerships that make clean energy projects possible and bring them to our communities. We're proud to say that New York State is a leader in renewable energy. In New York today, 27% of electricity already comes from renewable sources.[14] By 2030, the State plans to get 70% of its electricity from renewable sources — that's a big jump! During your lifetime, the way we power our everyday lives will change drastically.

One thing is for certain: investing in renewable energy sources like offshore wind is crucial to fighting climate change.

Electricity is measured in units called watts. Take a look at a lightbulb in your home or classroom. You might see "60W" or "40W" printed on the lightbulb, meaning that lightbulb uses 60 or 40 watts of power per hour it is turned on. A megawatt (MW) is one million watts and a gigawatt (GW) is one billion watts, which can power hundreds of thousands of homes. New York State is looking to create 9,000 MW (or 9 GW) of electricity from offshore wind by 2035. That's enough clean energy to power **six million** New York households every year!

GO ONLINE

Learn more about how energy is created with this Energy 101 video and the energy grid with this Electric Grid 101 video.

What is offshore wind all about?

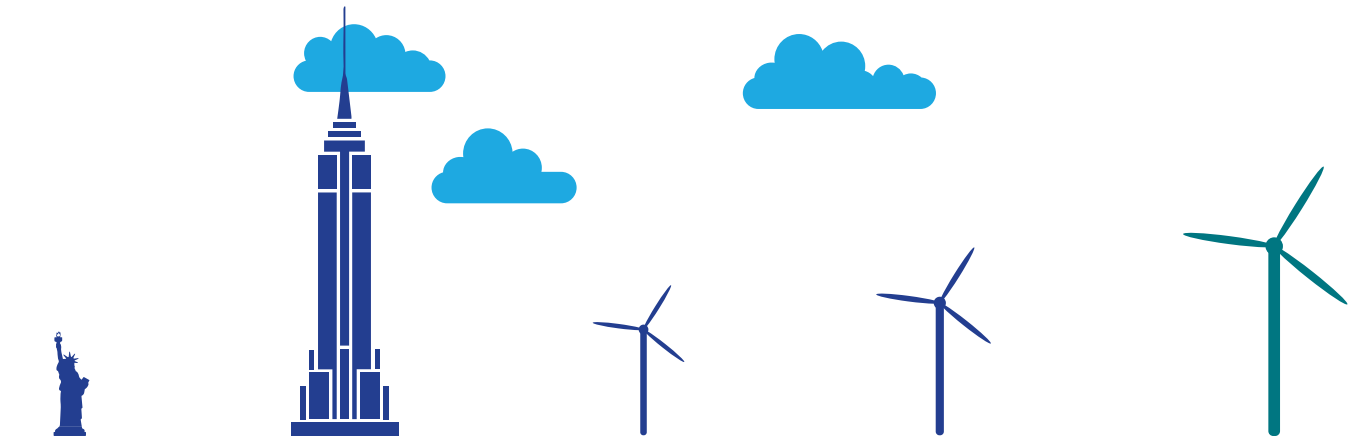
It's clear there are different types of energy and important benefits from renewable (or clean) energy for the planet and its people. It's time to dig into a special type of renewable energy: **offshore wind.**

How do we transform the wind into energy we can use every day? We start with large machines called wind turbines. The wind pushes the blades of the wind turbines, and when they spin, generators convert that wind power into electricity. Wind turbines can be built on land or out in the ocean; the important thing is that they are built somewhere that is consistently windy — the more wind, the more power!

Offshore wind turbines turn the ocean's strong winds into 100% renewable electricity.[18] Wind blows stronger, and more consistently, over the ocean than it does over land, making it an incredibly valuable renewable energy resource.[19] By strategically placing wind turbines in the ocean, in an array commonly referred to as a **wind farm**, we can generate a large amount of clean energy for our coastal communities and our entire state.

GO ONLINE

The scale can be hard to believe. See an offshore wind farm with your own eyes here.



STATUE OF LIBERTY
305 ft

EMPIRE STATE BUILDING
1,454 ft

AVERAGE ONSHORE TURBINE
466 ft

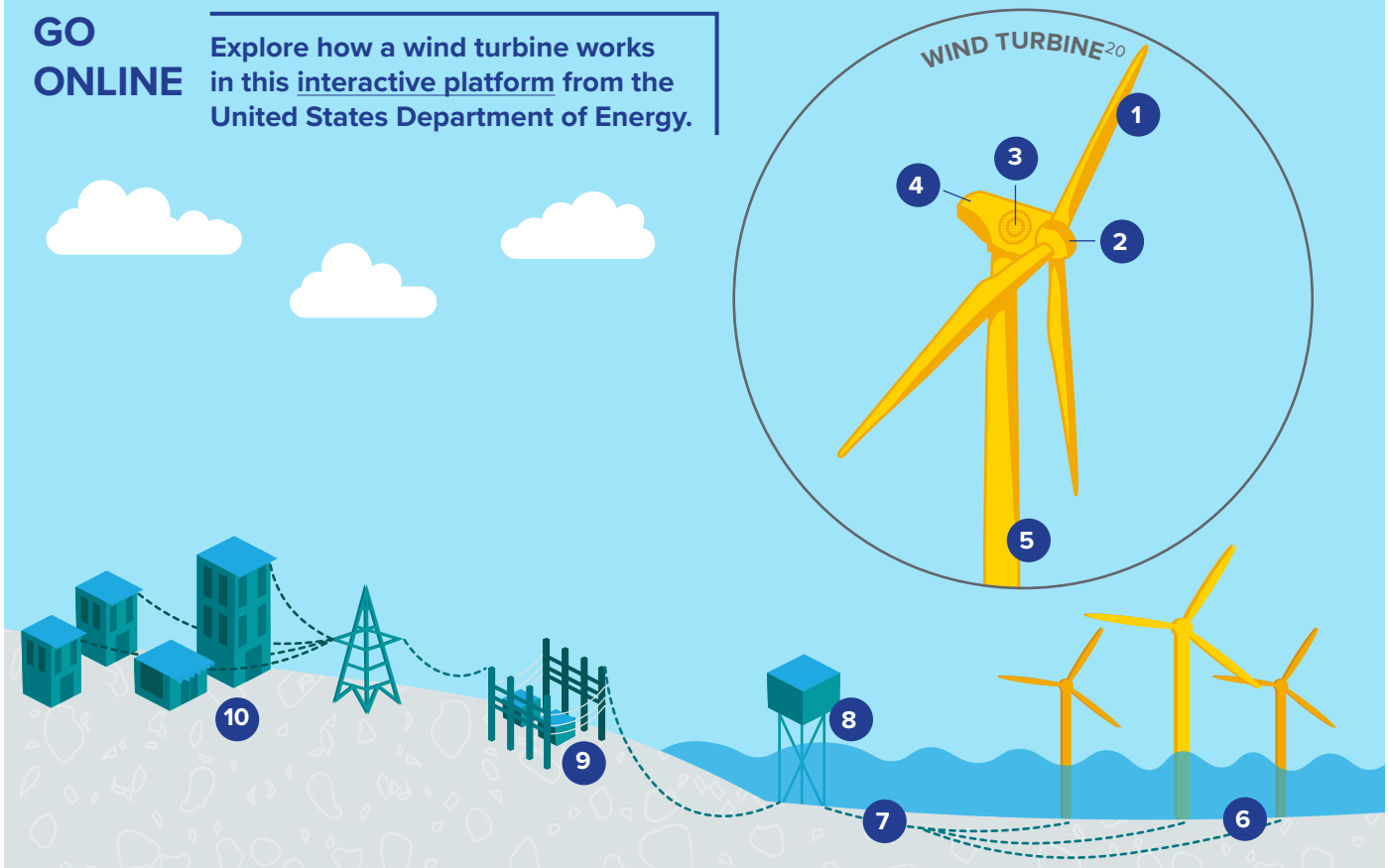
TALLEST ONSHORE US TURBINE
574 ft

US OFFSHORE WIND TURBINE
853 ft

When we say "large" turbines, we mean really large. Every turbine has three blades, each of which can be over 350 feet long and can stand as tall as the Statue of Liberty or higher! As of 2021, the tallest wind turbine in production stands at 850 feet high, which is as tall as some of the tallest skyscrapers in New York City.[15] The larger the turbine and blades, the more energy it can generate. How powerful are wind turbines? A single spin of some turbines can power a home for two days.[16,17] The average offshore wind farm off of New York's coast will include 80 to 100 turbines!

GO ONLINE

Explore how a wind turbine works in this interactive platform from the United States Department of Energy.



1. **Blades:** As the wind blows, the blades turn and capture wind power. Blades turn in the wind to generate electricity.
2. **Hub:** The hub holds the blades and controls their angle and rotation speed. The hub is engineered to turn to face into the wind to capture the most power.
3. **Generator:** The generator converts the mechanical energy created by the spinning blades into electrical energy using electromagnetism.
4. **Nacelle:** The nacelle holds the "brains" of the turbine, including lots of power equipment, control panels, meteorological equipment, and internet connections to "talk" to its neighboring turbines in a wind farm and the operations base that monitors its performance closely.
5. **Tower:** The tower is the longest part of the turbine. It is a tall, steel cylinder that supports the nacelle. Energy generated in the nacelle flows through electrical cables that run down the tower.
6. **Foundation:** The foundation of the wind turbine is anchored to the ocean floor to support the tower.
7. **Underwater Cables:** Cables that carry electricity are buried beneath the ocean floor. *Array cables* deliver the energy from the wind turbines to a substation out at sea. An *export cable* runs that energy to land.
8. **Offshore substation:** A specialized, elevated multi-deck structure out at sea that collects the electricity from the turbines and prepares it for export to land. The electricity passes through the export cable to an onshore substation, a similar structure that is located on land.
9. **Onshore substation:** A site on land that receives electricity generated by several energy sources and transforms it to power that flows through New York's electrical grid. This is where offshore wind energy "plugs in" before it travels to our homes, schools, businesses, and more.
10. **Grid:** Networks of power lines and power stations that convert and deliver electricity to homes, cities, entire regions, and you!

What makes *offshore* wind power special? Because wind tends to blow stronger and more consistently in the ocean than on land, there is more opportunity to generate large amounts of electricity from offshore winds. Producing electricity from wind power emits no air pollution or greenhouse gases, and wind is a resource that will never run out! Nearly one third of Americans, and over 80% of New Yorkers, live on the coast, and coastal populations are continuing to grow.[21,22] Offshore wind is unique in its ability to generate large amounts of clean energy close to heavily populated coastal areas, meaning the energy doesn't have to travel far to get to peoples' homes. This is a big deal for places like New York City and Long Island where there are a lot of people using electricity, but limited land space for large renewable energy projects.

Fortunately, the Atlantic Ocean off the East Coast of the United States has some of the strongest and most consistent wind power in the world.[23] The stronger the wind, the more opportunity there is to generate renewable energy that can power our homes, businesses, and schools.

In 2021, General Electric began production of one of the largest and most powerful wind turbines to date. The Haliade-X turbine will be able to generate 12-14 MW of energy and is expected to be rolled out for use by 2023![24] Bigger and more powerful turbines mean that fewer turbines are needed overall to generate large quantities of energy.

ACTIVITY: CLEAN ENERGY: TRUE OR FALSE

Summary: Test what you know about clean energy by quizzing each other with the provided clean energy flashcards or using the online quiz platform.
Materials: Printed clean energy flashcards or computers/smartphones to take the quiz online.
Prep Time: 10 minutes
Activity Time: 15 minutes

1. Print the clean energy flashcard sheets found on page 80-81 (one set per pair of participants) utilizing the double-sided printing setting.
2. Cut the sheets into individual flashcards so the question is on one side and the answer is on the other.
3. Pair up with another participant and use a set of flashcards to quiz each other on clean energy and offshore wind facts.

Digital version

4. Take the online quiz by opening the quiz on your computer or phone.
5. Select true or false on each of the statements.
6. When you're finished, click "Submit".
7. A new page will appear, click "View accuracy" to review the correct answers

WHO IS IN CHARGE OF BRINGING OFFSHORE WIND TO NEW YORK STATE?

Remember NYSERDA? We are the primary authority helping to bring offshore wind to New York State, in partnership with other State agencies. We choose the offshore wind projects that will deliver clean energy to our State and work with New Yorkers to make sure those projects are beneficial and developed in a way that considers all possible impacts. We makes recommendations to the Bureau of Ocean Energy Management (**BOEM**), which is a federal agency that studies the ocean environment, decides where to locate the wind farms (a process called **siting**), and leases offshore areas to the **developers** who will build and manage the wind farms.[26]

Who is a developer? Offshore wind developers are energy companies that build and operate offshore wind farms.[25] They are responsible for funding offshore wind projects, engaging local communities about the projects, and obtaining permits from state and federal government agencies to make sure the wind farms are safe and environmentally responsible.

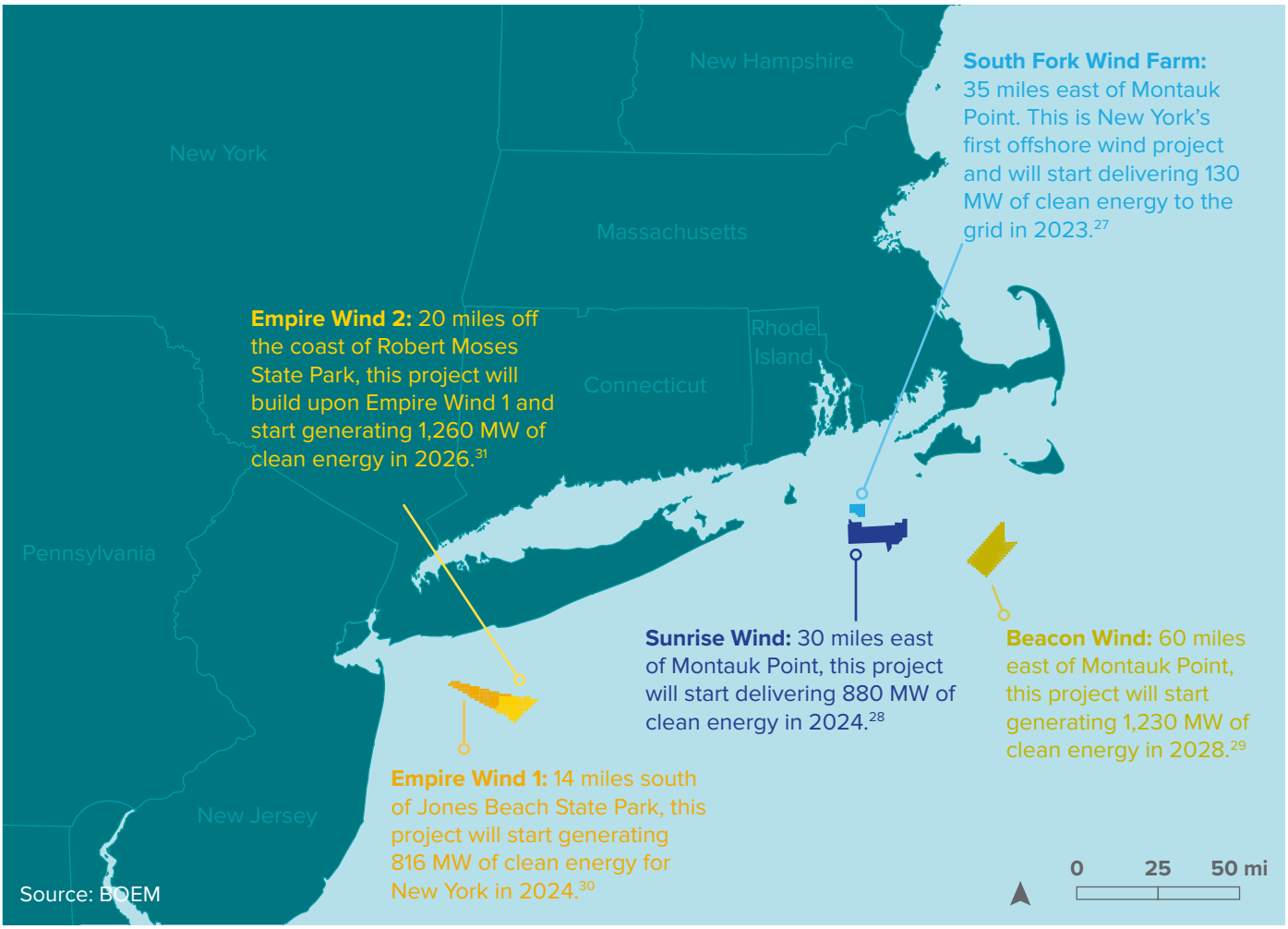
Credit: MHI Vestas Offshore Wind

What does offshore wind look like in New York?

In 2019 and 2020, New York State became a national climate leader by announcing some of the biggest projects and goals in the country to bring renewable energy and offshore wind power to the state.

THIS IS HISTORY IN THE MAKING AND YOU, AS A PARTICIPANT IN OWYA, ARE ALREADY A PART OF CREATING A CLEAN ENERGY FUTURE.

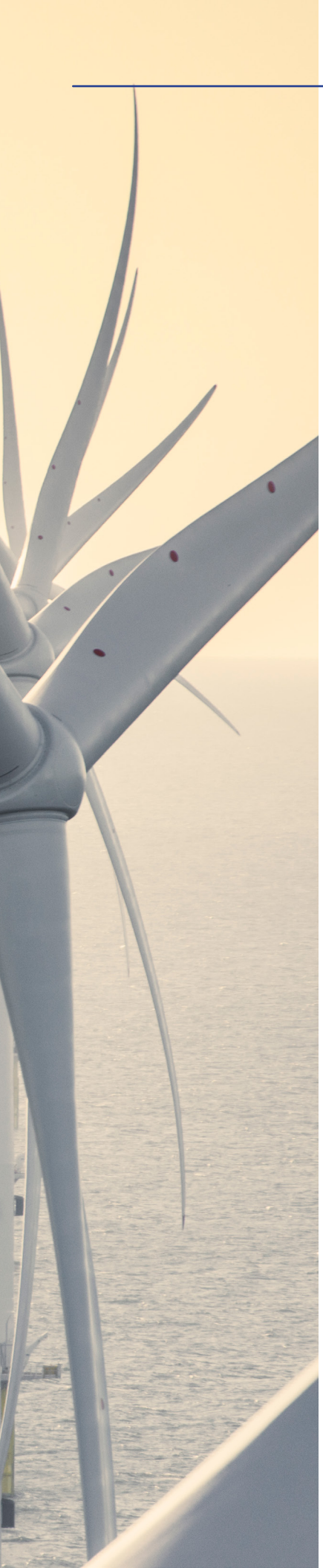
As of 2021, New York has five offshore wind projects in the works off the coast of Long Island which, combined, will deliver 4,300 megawatts of clean energy to our electricity grid. That's enough to power more than 2.4 million homes! These offshore wind farms will avoid 9.6 million metric tons of carbon dioxide emissions per year — equivalent to removing 2 million cars from the road each year!



It doesn't stop there: New York State is looking to build more offshore wind farms to reach the goal of 9,000 MW of offshore wind power by 2035. That is enough energy to power up to six million homes.[32]

GO ONLINE **Want to know more about the offshore wind projects coming to New York State? Check out NYSERDA's Projects!**

Credit: MHI Vestas Offshore Wind



So, what do these projects mean for New Yorkers? People from across the state and of all ages will be positively impacted by the growth of offshore wind in New York. The American Clean Power Association estimates that offshore wind development has the potential to create 83,000 jobs in 74 different occupations across the country by 2030![33] In New York alone, the five projects already in the works are expected to create nearly 7,000 jobs in manufacturing, construction, science and engineering, and maritime and technical industries. To prepare New Yorkers for these jobs, New York State has invested millions of dollars to create local education and workforce training programs.[34]

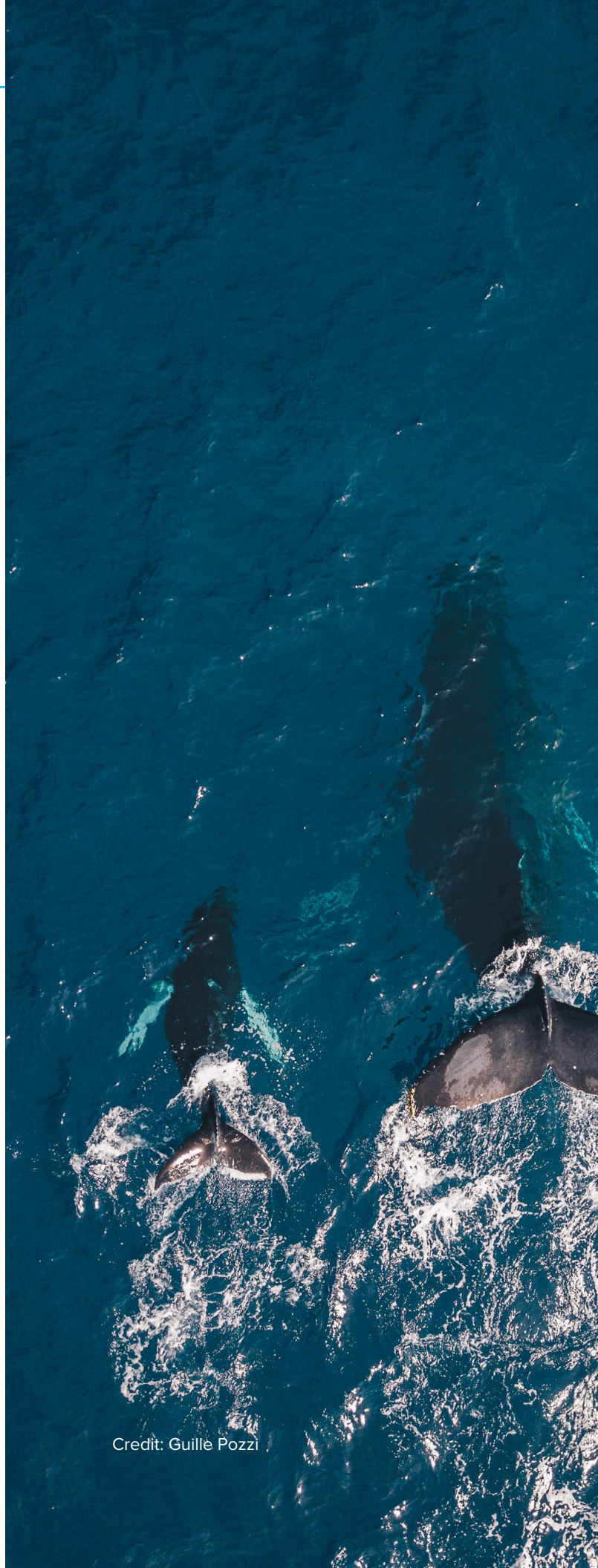
Where will you be in 2023 when the first turbines start delivering clean energy to New York's grid?

How old will you be in 2035 when a whopping 9,000 MW of offshore wind energy will provide enough power for a quarter of our state?

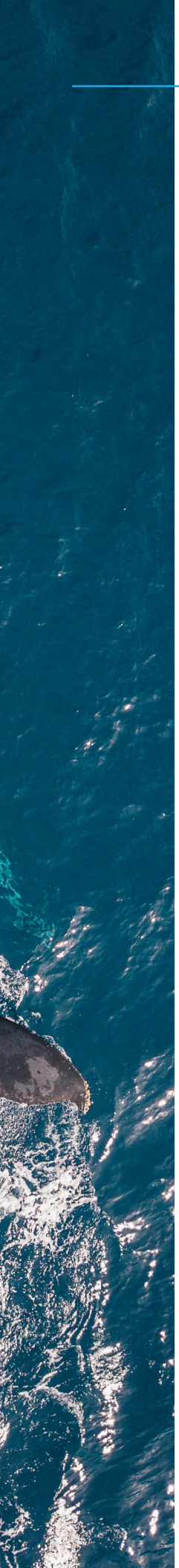
In addition to job creation, offshore wind will bring billions of dollars in investments and revenue to New York's economy.[35] Already, New York State and private industry have committed to investing $644 million in the South Brooklyn Marine Terminal and the Port of Albany to prepare their ports for offshore wind. Investments like these create well-paying jobs and generate local economic activity that lifts up communities. Local grassroots organizations, like UPROSE based in Sunset Park, Brooklyn, have deep knowledge of their communities' needs and how to best integrate offshore wind's economic benefits locally. They will work together with New York State and City officials to build long-term partnerships.

Offshore wind advocates and policy makers in New York are committed to what's called a **just transition**. A just transition means that switching to renewable energy should not only reduce the negative impacts of non-renewable energy sources, but it must also bring the positive impacts of renewable energy, such as new jobs and training programs, primarily to those same communities that have experienced the greatest environmental and health consequences from the fossil fuel industry. You will learn more about a just transition in Lesson 2.

Who else will be impacted by offshore wind? There are many people and industries that will impact or might be impacted by offshore wind development; they are commonly referred to as **stakeholders** because they have a stake in the issue at hand. Because so many different people (and animals!) rely upon ocean resources, building an offshore wind farm can present challenges to existing ocean users and wildlife, even though in the long-term, we all benefit from the slowing of climate change and a healthier planet.



Credit: Guille Pozzi



HOW DO WE DECIDE WHICH MARINE AREAS ARE SUITABLE FOR OFFSHORE WIND?

Believe it or not, the ocean is a very busy place. In 2010, New York State, along with BOEM, undertook an ocean planning process to prepare for offshore wind.[37] Ocean planning processes, called **marine spatial planning**, bring together different groups of people who use the ocean for a variety of purposes: commercial and recreational fishermen, marine biologists, mariners (people who operate ships), people who live along the coasts, and the military, to name a few. BOEM also consults with Indigenous Nations as part of the marine spatial planning process. Many Indigenous people hold traditional ecological knowledge and cultural values associated with their local environment and natural resources. For the Shinnecock Nation on Long Island, for example, whales continue to be an important part of their culture.

Marine spatial planning aims to gather all the data and knowledge of an ocean area to plan projects like offshore wind farms responsibly. Decision makers need to know what wildlife species move through the area and when, where sensitive underwater habitats are located, which areas are most important for fishermen, where ships pass through, which areas are used by the military, and which areas hold cultural significance for Indigenous Nations and other groups.

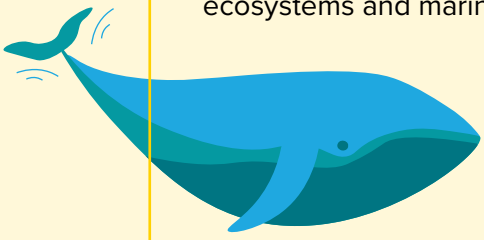
After gathering all this information, an offshore wind farm can be located in the best possible place to avoid conflicts with ocean users and wildlife. New York City is home to one of the largest ports in the country, along with thousands of wildlife species. It's a busy and important area for both humans and animals, which makes the marine spatial planning process all the more critical!

Scientists conduct many studies of the environment before, during, and after the creation of an offshore wind farm in order to protect wildlife and monitor any changes to the ocean ecosystem. While building an offshore wind farm may cause disruptions during construction, the costs of doing nothing are much worse. Climate change is causing the ocean to warm faster than any ecosystem on land. Warmer water temperatures are already seriously impacting ocean systems and wildlife by disrupting seasonal migration and feeding patterns and changing the actual chemistry of seawater. Scientists agree that the benefits of developing offshore wind to slow climate change far outweigh the costs. Some challenges and solutions that planners might encounter when siting an offshore wind farm are listed on page 33.

Did you know there are *six* whale species and *three* dolphin species that live and migrate off the New York coast?[36] You can even go whale watching out of Rockaway Beach, Queens with Gotham Whale, a group that conducts research on New York's dolphin and whale populations. The New York Aquarium also has a buoy off the coast of Long Island that contains underwater microphones to listen to whale songs so that scientists can identify which species are in the area.

Credit: Ørsted

CHALLENGES	OPPORTUNITIES	PATH FORWARD
Offshore wind farms could have disruptive impacts on wildlife. The noise from construction may interfere with whales' ability to communicate and find food, as well as cause injuries.	Rising ocean temperatures and ocean acidification caused by climate change are altering marine food webs and threatening species survival. Slowing climate change through transitioning to renewable energy such as offshore wind will safeguard the future of ocean ecosystems and marine life.	Wildlife scientists are consulted to determine movement patterns and locations of wildlife at different times of the year and identify ways to avoid, minimize, or mitigate impacts. For example, wind farms can be built during months when whales are not around, and developers are required to stop building if a whale is spotted nearby. NYSERDA also requires developers to create plans to minimize environmental and fishing disruptions.
Building an offshore wind farm could interfere with important fishing activities.	Turbines can act as artificial reefs to create habitat and attract fish to their bases. For instance, the offshore wind farm in Rhode Island has become a popular recreational fishing site, as marine life has grown on the turbine bases and attracted fish.	Fishermen are consulted during the planning and permitting processes to identify current fishing activities, transit routes, and other concerns to ensure productive coexistence after wind farms are developed.
Some people who live on the coast don't like the look of wind turbines because they impact their view, also called their viewshed.	Everyone benefits from the reduced carbon emissions and cleaner air that comes from transitioning to renewable energy. Offshore wind creates new jobs through long-term investments in communities. Some people enjoy seeing wind turbines off the coast, as they are a sign of sustainability and technological advancement.	Other people are looking forward to catching a glimpse of the turbines on clear days because they represent a clean, bright future. Plus, the technology is pretty cool! The reality is that most wind farms in the U.S. are located so far offshore that the turbines will appear to be quite small on the horizon or they won't be visible at all.



ACTIVITY: SITE PLANNING ROLE PLAY

Summary: Take on the roles of different ocean stakeholders, explore regional ocean use maps, and collaboratively select an appropriate site for an offshore wind farm while balancing stakeholder needs. You will understand the many uses of the ocean and competing interests of stakeholders while practicing collaborative decision making.
Materials: Character cards, negotiation worksheets, and ocean maps (printed or online)
Prep Time: 30 min
Activity Time: 30 min-1 hour

Activity Prep:

a. Read the Marine Spatial Planning section on page 31-33, to understand the concept of marine spatial planning prior to doing the activity.
b. Print out the stakeholder character cards on page 82-84 and cut them up into individual cards (each participant should get their own card. If there are more participants than characters, print multiple character card pages — duplicates across the group are okay).
c. Print out the negotiation worksheets (one per participant) and the activity maps (one set per participant group) on page 85-91.

Activity Instructions:

1. Break into groups of 3-5 participants.
2. Each group member should have their own stakeholder character card (if participants have the same character, make sure they are different groups).
3. Review the information on your card to get to know the character you have been assigned. You will be in charge of embodying that character during negotiations with fellow participants, who will represent different viewpoints that may be at odds with one another.
4. Next, complete the negotiation worksheet individually, reflecting on the key interests and concerns for your character when it comes to offshore wind planning.
5. Come together in your groups. Your objective is to pick an area in the ocean to site an offshore wind farm that all characters can agree to based on their interests. Review the provided ocean maps with your group. Discuss potential locations and talk through decision-making as your characters. This will require strategic teamwork and compromise.
6. Once groups have come to an agreement on where the offshore wind farm should be developed, each group should present their outcome to the rest of the class. What ocean area(s) did you identify? What challenges did you face in your negotiations? Did anyone's needs go unmet?
7. To finish the activity, discuss with the class what you learned about your character's needs, the needs of other stakeholders, and anything unexpected that you hadn't previously considered.

Take it further: *Visit the Mid-Atlantic Regional Council on the Ocean's Data Portal. This data portal contains ocean maps of fishing areas, marine mammal migration routes, shipping lanes, and more. Explore these maps by clicking on the different layers in the panel on the left hand side of the screen.*

Credit: Siemens

What do you think? Are the benefits of offshore wind for job creation and environmental and human health worth the challenges? Many stakeholders believe they are. In New York, clean energy advocates, labor unions, and environmental groups have come together to support the responsible development of offshore wind as a means to mitigate climate change.

Work in groups of 2-3 and share five groundbreaking facts about climate change, renewable energy, or offshore wind as a Tweet, GIF, or Tik Tok video. As a class, vote on the best post.

ACTIVITY: LESSON 1 KEY TAKEAWAYS

Summary: Reflect on what you've learned in Lesson 1 of OWYA by answering questions from the key takeaway flashcards.
Materials: Printed key takeaway flashcards
Prep Time: 10 min
Activity Time: 15 min

1. Print the key takeaway flashcard sheets found on page 92-94 (one set per pair of participants) utilizing the double-sided printing setting.
2. Cut the sheets into individual flashcards so the question is on one side and the answer is on the other.
3. Pair with another participant to review the key takeaways together. Alternatively, group leaders can ask these questions of the whole class to facilitate a wrap-up conversation.

Credit: MHI Vestas Offshore Wind

Review What You've Learned

Congratulations on completing Lesson 1! Take a moment to look back on what you've learned:

You learned:

- OWYA is an initiative led by NYSERDA on behalf of New York State that is engaging young people across the state in their efforts to combat climate change.
- There are important differences between renewable and non-renewable energy sources that affect our planet and health.
- New York State is taking ambitious steps toward a cleaner environment.
- Offshore wind is a critical type of renewable energy for New York State.
- Offshore wind development impacts many groups of people, is happening in New York State now, and will bring enormous benefits, from better health to new jobs, to many New Yorkers.

You asked yourself:

- Why is climate change important to me and my community?
- How will an offshore wind turbine provide electricity that I will use every day?
- What am I most excited about for the future of offshore wind?

Looking Ahead at Lesson 2: How Does Offshore Wind Relate to My Community and Me?

In Lesson 2, you'll build on what you learned about climate change and offshore wind to explore how offshore wind will impact your community, including the benefits and opportunities you and your neighbors will experience from offshore wind development.

Looking Ahead at Lesson 3: How can I get involved in offshore wind in New York State?

In Lesson 3, you'll go even deeper into understanding your clean energy future. It will be an opportunity to participate in offshore wind, in ways that can be big or small! From continuing to learn about and discuss offshore wind and renewable energy with your teachers, friends, and family or exploring job and training opportunities or getting involved with a local organization, you'll chart your path as part of New York's clean energy future.

2

How does offshore wind relate to my community and me?

What does offshore wind mean for my community?

Renewable energy, including offshore wind, is a key tool to help lessen the impacts of climate change. But what does offshore wind means for New York communities, like yours? It's clear that transitioning away from fossil fuels by switching to renewable energy sources will slow global climate change and create a cleaner environment. This change will also create thousands of jobs in new clean energy industries and bring billions of dollars of economic investment into communities across New York.

SO, HOW WILL OFFSHORE WIND AFFECT *YOUR* COMMUNITY?

Wind farms out in the ocean are just one piece of the offshore wind puzzle. Communities across the state will benefit from the growth of offshore wind in many ways. **What will it look like for you?**

If you live near the coast, a port, or a manufacturing facility, you might experience direct economic benefits from offshore wind. Communities from the eastern tip of Long Island up the Hudson River to the Capital Region could interact with the offshore wind industry. Even if you don't live near the water, your community may still participate in offshore wind by providing offshore wind supplies and services, or hosting training and apprenticeship programs.

Credit: MHI Vestas Offshore Wind

FOLLOW THE CREATION OF AN OFFSHORE WIND TURBINE, JOURNEYING FROM FACTORIES, TO PORTS, TO THE OCEAN.*

1 PLANNING

ASSEMBLY

MANY TURBINE COMPONENTS ARE PRE-ASSEMBLED AT LARGE PORT FACILITIES BEFORE BEING TRANSPORTED TO PROJECT SITES IN THE OCEAN

THIS PLANT IS MANUFACTURING WIND TURBINE GENERATORS, WHICH CONVERT WIND POWER TO ELECTRICITY

2 MANUFACTURING

Massachusetts

Connecticut

5 OPERATIONS AND MAINTENANCE (O&M)

3

4 INSTALLATION

* Learn more about each step of this journey on the next page.

1 PLANNING

Years before any clean energy production can begin, government officials, offshore wind developers, community residents and other stakeholders* work together to plan where different phases of offshore wind development will take place. In Lesson 1, you learned that the federal government is in charge of siting offshore wind farms. In addition, state and local governments work with offshore wind developers and stakeholders to decide where and how projects will plug into the State's electricity grid. Developers work directly with local communities to determine what existing resources, like ports and factories, can be upgraded or built to support offshore wind development and what kinds of investments or training programs they'd like to see more of.

A wide range of stakeholders — like local business owners, community groups, environmental groups, labor organizations, the ocean's frequent users such as maritime professionals and commercial fishermen — all bring their knowledge and unique experiences to planning conversations. Together, they determine how to maximize the economic and clean energy benefits of offshore wind for New Yorkers and minimize potential adverse impacts to ocean resources and resource users. *Could you see yourself participating in offshore wind planning in the future?*

*In Lesson 1, you learned that stakeholders are all of the people who may interact with a project or have an interest in it.

2 MANUFACTURING

Offshore wind turbine components, like the foundations, towers, and blades that were discussed in Lesson 1, are manufactured at factories around the world and in parts of New York State. Remember, offshore wind turbines are really, really big – a single blade can be taller than the Statue of Liberty! Because the turbines are so large, much of their production happens at ports, which provide easy access to the water. In fact, the Port of Albany (in Albany, New York's capital) will be the first offshore wind tower manufacturing site in the United States! That means there will be new training opportunities and jobs for communities in the Capital Region and supply opportunities around the State. *Is your community near manufacturing facilities? For example, do you live near a proposed offshore wind tower manufacturing factory or a steel mill? What about shipyards where special vessels can be constructed to support offshore wind?*

3 ASSEMBLY

Once the parts of the offshore wind turbine are manufactured, they are loaded onto barges and shipped to ports closer to the project area. At these large staging facilities, some turbine components are pre-assembled to reduce the amount of work that needs to be done out on the water, where ocean conditions can make those steps more difficult. The South Brooklyn Marine Terminal in Sunset Park, Brooklyn, will be used to assemble some of the turbine components that will come in from the Capital Region and elsewhere. Like manufacturing, assembling these large parts requires lots of workers which means job opportunities for New Yorkers. *Are you close to a large port facility? Depending on your location, the port may be able to support manufacturing, assembly, or both!*

4 INSTALLATION

After some of the turbine parts are assembled on shore, they are loaded onto barges or specialized ships, called installation vessels, that carry them out to sea. Depending upon the route, the foundations and towers may even be carried upright on the ships so they can be directly installed on the ocean floor. Because these parts are so tall, planners need to consider bridges on the route to the project area in determining the project's installation and logistics plan. In New York City, for example, ships leaving the South Brooklyn Marine Terminal will pass under the Verrazano Bridge and will use feeder barges to access installation vessels, but other ports in the region may support their direct use.

At the project site, a common installation method uses a ship, called a jack-up vessel, that puts "legs" down on the seafloor and raises the ship into the air, as if it is on stilts. This allows technicians to install the turbines more easily and precisely, without being rocked by waves. You heard that right: standing ships! After foundations are installed on the seafloor, the tower, nacelle, and blades are assembled like giant lego pieces standing in the ocean. An entire turbine can be installed in one day. This massive, carefully planned operation can be exciting to see! *Would you try to catch these large components passing through our waterways en route to their final destination?*

> Offshore wind developers Ørsted and Eversource will charter the United States' first offshore wind turbine installation vessel. The vessel, called Charybdis, is being manufactured in the United States and once complete, will support the development of Sunrise Wind as well as Revolution Wind, which is off the coast of Rhode Island.

5 OPERATIONS AND MAINTENANCE (O&M)

Once installed, offshore wind farms can begin to deliver renewable energy to our electricity grid through underwater cables that come onshore at strategic points along the New York coast. Those communities that agree to "host" export cables receive financial benefits from offshore wind developers over the operational lifetime of the projects. *Do you live in a community where offshore wind energy plugs into our grid?*

Maintaining offshore wind farms to make sure they are working properly is a full-time job. Maintenance facilities will be located close to wind farms so that workers can quickly address any issues that arise. On Long Island, Montauk Harbor and Port Jefferson Harbor will be used as regional O&M hubs for offshore wind developer Ørsted, which will create long-term, well-paying careers in the offshore wind industry. *Do you live near a current or potential O&M port? Check out this map to find out.*

DO YOU LIVE IN A COASTAL COMMUNITY ON THE ATLANTIC OCEAN?

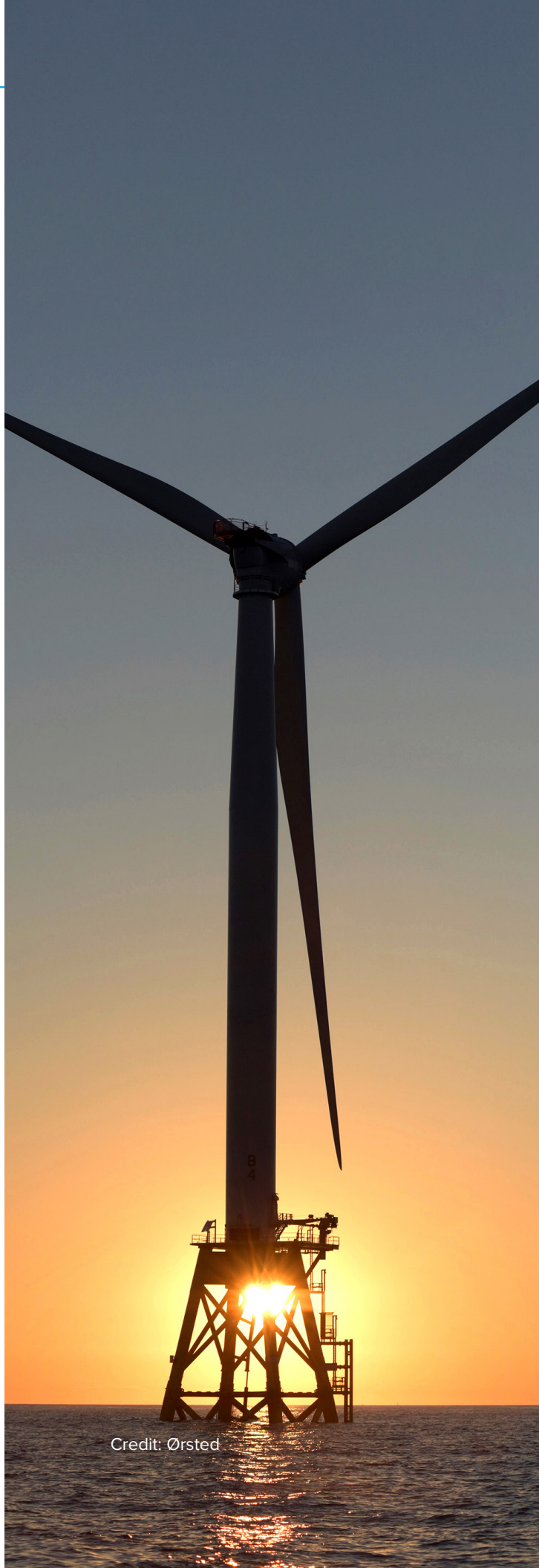
Offshore wind farms will create new opportunities for recreational fishing trips and sightseeing cruises off of your shore. The underwater portion of the wind turbines provide an attractive surface for seaweeds, corals, mussels, and other marine life to grow on. Over time, turbines, shipwrecks, and other sunken structures become habitat for marine plants and animals. The growth of a new marine habitat on human-made infrastructure is called an **artificial reef**. Fish are attracted to these artificial reefs because they provide food and shelter. This means more opportunities for **recreational fishing**, or fishing that is done for personal use and fun, and **ecotourism**, which is tourism focused on the natural environment.

GO ONLINE

Take a look at this artificial reef growing on the base of a wind turbine and check out this video about the artificial reef and recreational fishing opportunities created at the Block Island Wind Farm in Rhode Island, the first offshore wind farm in the US!

Did you know that over 2,500 of New York City's old subway cars have been sunk off the coast of the city to create artificial reefs? These sunken subway cars are popular fishing sites for local fishers![38]

Where is home for you here in New York State? Post a series of pictures that show your fellow OWYA participants around the state what makes your hometown special. Do you live near a body of water? Does your community already have renewable energy like solar or wind? What natural areas are you proud of and want to protect? Post with #[InsertHomeTown]Pride #OWYA



Credit: Ørsted

Even if you don't live near the coast, a port, or manufacturing centers, you'll still experience these benefits of offshore wind:

- Offshore wind will **help New York State transition to 100% zero emissions electricity.** We will all share the environmental and health benefits that come from leaving behind polluting fossil-fuel power plants and transitioning to large-scale clean energy. What is really important is that this transition will help lessen the harmful impacts of climate change here at home and around the world.
- This new industry needs new workers. Offshore wind training programs and apprenticeship programs will **lead to jobs for those excited to work in the clean energy industry.** While many jobs will be located near the offshore wind farms themselves, training programs are developing across the state.[39] By 2035, offshore wind has the potential to create more than 10,000 jobs in New York.[40] You'll learn more about the different kinds of jobs that are needed to make offshore wind a reality in Lesson 3.

GO ONLINE

Explore this map of offshore wind training programs, ports, and workforce apprenticeship programs across New York State! Can you identify any opportunities near you?

ACTIVITY: HOMETOWN FLYER

Summary: Create a flyer using Canva that you would post around your school or hometown to explain what benefits and changes residents might see from offshore wind.
Materials: Computers to access Canva
Prep Time: 10 min
Activity Time: 30 min

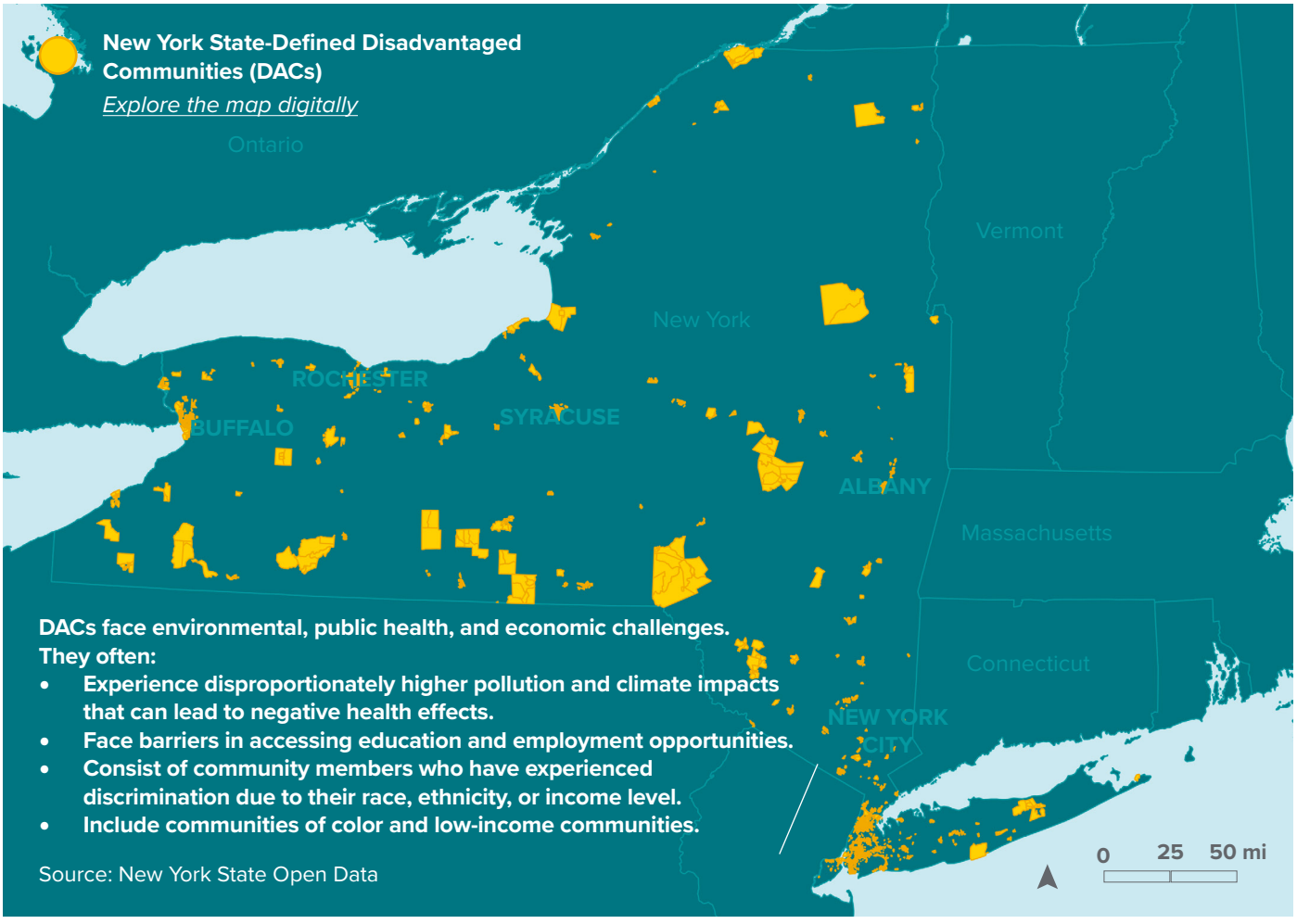
1. Visit the free online design platform, Canva. Click "Get Canva Free".
2. Follow the prompts to sign up for a free Canva account.
3. Choose what kind of document you want to create: A poster? An infographic? A brochure?
4. Once you've selected your document type, review the provided templates.
5. Choose a template you like. Click on different design elements within the template to customize colors or fonts. Double click to edit text.
6. Review the options on the left sidebar. You can upload your own photos or add GIFs and graphics.
7. Imagine this flyer is for your neighbors or classmates. Do they know what offshore wind is? Do they know about the jobs and environmental benefits coming to your community? Consider the key points they should know, and how to convey those points in a visually engaging way.
8. When you're finished, click the ". . ." icon in the top right corner of the page to download and print your document or share it on social media.

Offshore wind affects communities differently. Why does that matter?

You now know how offshore wind development can interact with communities across the State. It is important that the choices we make about how and where to develop offshore wind are part of a **just transition**, or fair change. In Lesson 1, you learned that a just transition means that shifting to renewable energy will not only reduce negative impacts, like air pollution, but will also bring positive impacts, like new jobs, to communities that have experienced the greatest environmental and health consequences from industrial pollution, fossil fuel energy facilities, and climate change.

SO, HOW DO WE BRING A JUST TRANSITION TO LIFE?

Let's start by identifying the communities that will benefit the most from a just transition — primarily, they will be disadvantaged communities (DACs). DACs are defined by New York State as communities that face environmental, public health, and economic challenges.[41] Disadvantaged communities may experience excessive pollution or climate impacts that can lead to negative health effects, face barriers in accessing education and employment opportunities, or consist of community members who have experienced discrimination due to their race, ethnicity, or income level. DACs often include people of color and low-income communities (communities with higher-than-average poverty rates compared to the city or country they are located).



GO ONLINE

Check out the Climate Justice Alliance's resources. What from the site was most meaningful to you? Which of their principles for a just transition inspire you the most?

Not all communities are equally impacted by climate change and the fossil fuel industry. In fact, climate change, pollution, and environmental disasters often have the greatest impacts on DACs. These communities bear the brunt of environmental, public health, and economic burdens due to decisions made by governments and corporations that allowed these communities to be most exposed to hazards throughout history. This unequal distribution of environmental hazards and environmental burden, based on income level, race, national origin, or location is called **environmental injustice.**[42]

There are, unfortunately, many examples of environmental injustice in the United States. For instance, health issues like asthma and cancer, arising from air and water pollution, are more common in DACs because fossil fuel power plants and other polluting industries are often located there — and not by accident.[43] Historically, these facilities were located in these communities *because* they were valued less than middle- and high-income or white neighborhoods. Similarly, climate impacts like sea level rise and hurricanes regularly have the harshest effects on DACs because they are often located in places more vulnerable to hazards. Living without exposure to these environmental and health hazards is a privilege that not everyone enjoys equally. Many use the term **climate injustice** to describe the ways that unfair climate impacts make social, economic, and health inequities worse for DACs.[44]

DACs have long experienced disproportionate impacts from environmental hazards and climate change. In response to this historical injustice, the environmental justice movement was born. This movement, which gained momentum in the 1980s and was initiated by leaders of color from a wide range of backgrounds and ages, works to address environmental injustice and promote environmental, economic, and social justice for everyone. Climate justice means that everyone has equal protection from environmental hazards and climate impacts, equal access to the natural environment, and equal opportunity to participate in decisions that impact the human and environmental health of their communities.

Credit: Callum Shaw

On very hot or very cold days, energy usage spikes as people are heating or cooling their homes, and this strains our electricity grid. Especially downstate, in New York City and on Long Island, these spikes in energy usage during periods of peak demand activate highly polluting fossil fuel power plants, known as "**peaker plants**," to produce extra energy to fulfill the city's needs.

Peaker plants emit hazardous air pollutants and are often located in DACs. In fact, over 700,000 people in New York City live within one mile of a peaker plant, and a large majority of them are either low-income or people of color.[45] That means that even though all New Yorkers are contributing to the higher electricity demand in our State, only certain groups of New Yorkers are dealing with its negative consequences like asthma, lung cancer, and other serious health issues associated with air pollution.[46] This is a clear example of **environmental injustice**. As climate change disrupts weather patterns, bringing heat waves or periods of extreme cold, more energy usage can be expected. The PEAK Coalition is a group composed of local climate justice leaders who advocate that we should replace peaker plants with renewable energy solutions. In 2020, the New York Power Authority agreed to evaluate how they could transition six of their peaker plants to renewable energy systems.[47] To learn more about peaker plants and the organizations spearheading this initiative, visit the PEAK Coalition's website.

GO ONLINE

Learn more about environmental injustice from a local to global scale in this animated film.

There are many creative ways to learn about environmental injustices, the forms it can take in our communities, and how we find solutions. Check out this comic created by CUNY School of Law's Social Justice Initiative.

ACTIVITY: ENVIRONMENTAL JUSTICE MAPPING

Summary: Use the New York State DEC's interactive GIS tool to map environmental hazards in your community.
Materials: Computers to access mapping tools
Prep Time: 10 min
Activity Time: 10-30 min

1. Visit the DEC info Locator tool. Zoom in to any community in New York State.
2. In the sidebar on the left of the page, expand the "permits and regulations" tab. Check the boxes of layers you would like to view. You can look for oil storage facilities, active landfills, and more.
3. Under the "public involvement" tab, check the box for "potential environmental justice areas." Do these areas align with the other layers you viewed?
4. What do you notice about the distribution of environmental hazards across the state? Do some areas have more hazards than others? What about your own community? Were you previously aware of any of these sites in your community?

***Take it further:** The EPA's Environmental Justice Screening and Mapping Tool, EJSCREEN, provides a visualization of national demographic and environmental data. Search for any city or address within the tool. Click "Add Maps" to see the data on hazardous waste sites, income levels, and more. Are you surprised by any of the information you see?*

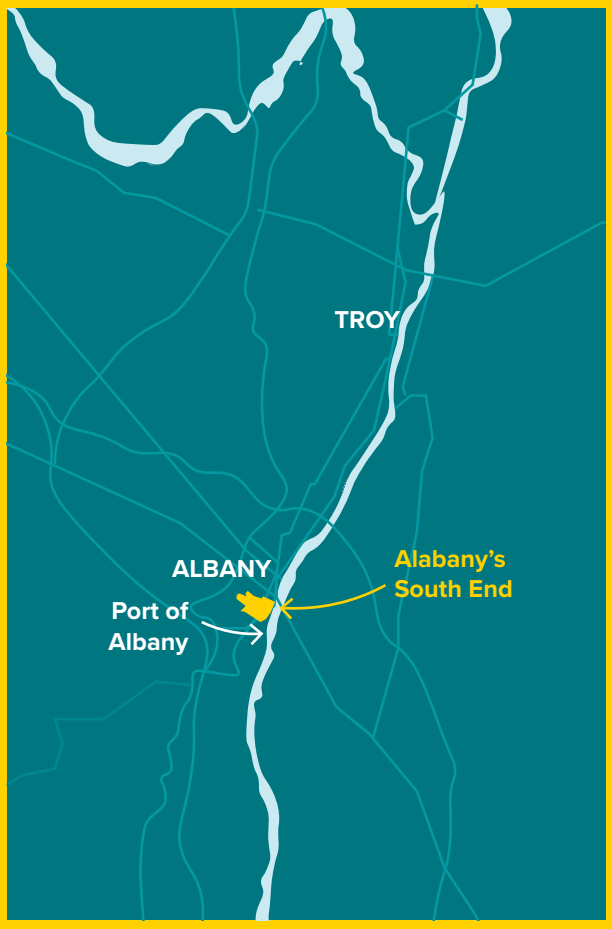
Different groups of people can have slightly different definitions of environmental justice. To see how some environmental leaders define their work, check out the following organizations and agencies leading the way:

- **The US Environmental Protection Agency (US EPA)**: the primary federal agency responsible for enforcing laws that protect human health and the environment.
- **New York State Department of Environmental Conversation (NYS DEC)**: the State's environmental protection and regulatory agency, in charge of programs designed to protect and enhance the environment.
- **NY Renews**: a coalition of over 200 environmental, justice, faith, labor, and community groups. Together, they fight for good jobs and climate justice.
- **Climate Justice Alliance (CJA)**: a national coalition of organizations focused on environmental justice and advocating for a Just Transition that centers gender, race, and class equity.

GO ONLINE

Art plays an important role in spreading awareness about climate change and climate justice. Artists from muralists to actors have utilized creative ways to engage the public about climate issues. Check out the High Water Line project by artist Eve Mosher. Eve walked around New York City painting a high-water line mark on the sidewalks to show where the water would be with 10 feet of sea level rise. This art project was a way to spark conversation about climate change and build community around neighborhood-specific solutions to sea level rise and flooding. Art can also be used in advocacy forums. Artist Favianna Rodriguez focuses her work on social and climate justice. You can explore her tips for creating posters and other resource guides.

Albany's South End, a predominantly Black neighborhood located near the Port of Albany, is considered a DAC. Beginning in 2014, residents of the Ezra Prentice Homes expressed serious concerns about air pollutants in their neighborhood and organized to oppose the expansion of a crude oil facility at the Port of Albany. In partnership with Earthjustice, a national environmental advocacy organization, the community took legal action to stop the expansion of the oil facility and protect the air quality of their neighborhood. In 2018, the oil company abandoned its plans for expansion,[48] and the New York State Department of Environmental Conservation partnered with the community to complete an Air Quality Initiative in the South End to study local sources of air pollution and improve air quality. In 2021, New York State announced that the Port of Albany will be a hub for offshore wind manufacturing activities, bringing economic benefits and opportunities for surrounding communities to be part of a just transition to a clean energy economy. Community engagement will be a key part of the responsible development of offshore wind.



GO ONLINE

For more on the history of the environmental justice movement, watch this short film in which Robert Bullard, "father of environmental justice," describes how the movement gained international attention following protests of a toxic waste landfill in a predominantly Black town in Warren County, North Carolina in 1982.

For many, using our voices can help us understand and process climate change and environmental injustices. Watch this environmental justice spoken word by youth from DC Youth Slam. In New York, the youth program Climate Speaks trains students in creative writing and performance about the climate crisis.

A clean energy future in New York State is centered on a just transition. That means that every person, regardless of their race, income level, national origin, or location can live without suffering from the hazards of climate change and pollution, and can participate in the economic opportunities that an economy based on renewable energy will provide.

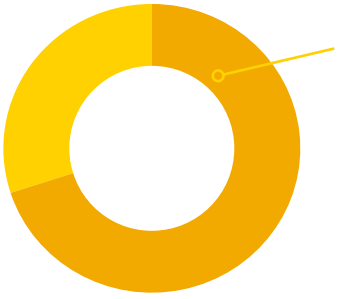
How will clean energy sources, like offshore wind, help New York become environmentally just?

WHAT DOES CLIMATE JUSTICE LOOK LIKE IN NEW YORK STATE?

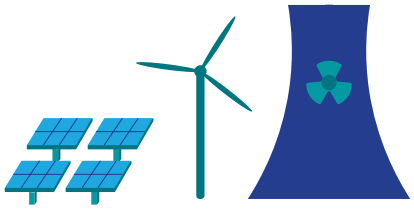
In 2019, New York State passed the **Climate Leadership and Community Protection Act**, also known as New York's "Climate Act." The Climate Act is the result of years of work by local climate justice leaders, and it is intended to make meaningful changes for the future of DACs. The Climate Act commits the State of New York to getting 70% of our electricity from renewable sources by 2030, 100% zero-emissions electricity by 2040, installing 9,000 MW of offshore wind by 2035, and, importantly, requires at least **35%– with a goal of 40%– of the benefits from all climate and clean energy investments go to DACs**.[49] This is a historic commitment to environmental, social, and economic justice, and it is crucial to a just transition in New York.

The Climate Act originated from a coalition of over 200 environmental and economic justice organizations, labor unions, faith communities, schools, and more, called New York Renews, who joined forces to advocate for clean energy, good jobs, and climate justice for all New Yorkers. New York State passed the Climate Act to make it a law– setting the most ambitious climate and energy equity goals in the nation.

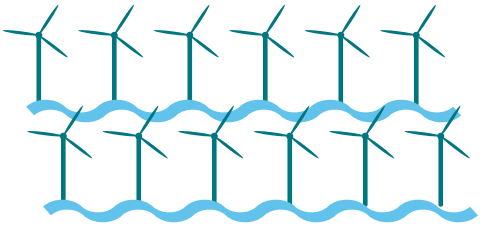
NEW YORK STATE CLIMATE ACT COMMITMENTS



70%
of New York electricity will come from renewable sources by 2030



100%
zero-emissions electricity by 2040



9,000 MW of offshore wind by 2035

40%
of the benefits from all climate and clean energy investments go to DACs

GO ONLINE

Learn more about the 22-member Climate Action Council, seven advisory groups, and the Climate Justice Working Group, consisting of experts and community leaders from across New York that are helping the state create policies and a plan of action to meet the Climate Act's goals and ensure that all residents in New York benefit from these actions.[50] Creating these advisory councils was an intentional step in achieving climate justice by involving community members in the decision-making process.

In order to reach the ambitious climate goals of the Climate Act, New York State will invest in electric vehicles and public transportation, upgrade buildings to be more energy efficient, and of course, invest in renewable energy like offshore wind![51] New York State is fully committed to improving the health and well-being of New Yorkers and supports opportunities for all New Yorkers to secure good jobs and build a cleaner, healthier future. Because offshore wind is such a large undertaking, there are many opportunities to involve New Yorkers and prioritize DACs in the economic benefits the industry will bring. You can be a part of this future no matter where you are in New York State.

ACTIVITY: OFFSHORE WIND NEWS SCAN

Summary: Identify how New York's offshore wind projects are advancing the goals of the Climate Act by reading news stories on the State's most recent offshore wind actions.
Materials: Computers to access online news sources
Prep Time: 10 min
Activity Time: 20 min

1. Search for "South Fork Wind Farm," "Empire Wind," "Sunrise Wind," and "Beacon Wind" online.
2. Review what you find. Look for articles in local newspapers, announcements from developes, NYSERDA press releases, and industry news sources like offshorewind.biz and renews.biz.
3. Based on what you've read, how do New York's offshore wind projects advance the goals of the Climate Act?
4. Use NYSERDA's mapping tool to identify which neighborhoods in New York are considered DACs. Were these neighborhoods, or local organizations, highlighted in any of the articles you found?
5. What does this research reveal about the kind of information shared by different news outlets?

ACTIVITY: LESSON 2 KEY TAKEAWAYS

Summary: Reflect on what you've learned in Lesson 2 of OWYA by answering questions from the key takeaway flashcards.
Materials: Printed key takeaway flashcards
Prep Time: 10 min
Activity Time: 15 min

1. Print the key takeaway flashcard sheets found on page 94-95 (one set per pair of participants) utilizing the double-sided printing setting.
2. Cut the sheets into individual flashcards so the question is on one side and the answer is on the other.
3. Pair with another participant to review the key takeaways together. Alternatively, group leaders can ask these questions of the whole class to facilitate a wrap-up conversation.

Credit: MHI Vestas Offshore Wind

Credit: MHI Vestas Offshore Wind

Review What You've Learned

Congratulations on making it to the end of Lesson 2! You've been introduced to a lot of new concepts, vocabulary, and facts. Take a moment to look back on what you've learned during Lesson 2:

You learned:

- That the planning, building, and operation of offshore wind farms interacts with New York communities in different ways and requires specialized facilities for manufacturing and assembly, thousands of workers with specialized skills, and many local suppliers and workforce training partners.
- That offshore wind will provide economic benefits to communities across the state in the form of direct investments in wind turbine materials, infrastructure upgrades, and procurement of supplies and services to support the creation and operation of wind farms. Offshore wind will also create new education and training programs that lead to good jobs and careers in this fast growing industry.
- About the importance of environmental and climate justice and how a just transition to renewable energy can support communities that have been treated unfairly in the past to receive the benefits of a clean energy future.
- About the importance of New York's historic Climate Act and New York State's commitment to improving the health and well-being of all New Yorkers, especially those living in DACs.

You asked yourself:

- How will offshore wind interact with my neighborhood?
- Why are environmental and climate justice important to my community and other communities in New York State?
- What is a just transition and how can it lead to a better future for everyone?

Looking ahead at Lesson 3: How can I get involved in offshore wind in New York State?

In Lesson 3, you'll go even deeper into understanding your clean energy future. It will be an opportunity to participate in offshore wind, in ways that can be big or small. From continuing to learn about and discuss offshore wind and renewable energy with your teachers, friends, and family, to exploring job and training opportunities, to getting involved with a local organization, you'll chart your path part of New York's clean energy future.

3

How can I get involved in offshore wind in New York State?

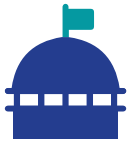
How you can shape *your* clean energy future

CONGRATULATIONS, YOU'VE MADE IT TO THE FINAL LESSON OF OWYA!

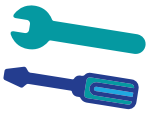
You've learned about the urgency of slowing global climate change and how offshore wind is a key part of New York's just transition to 70% renewable sources of electricity by 2030. As young New Yorkers, you can be a part of that! This final lesson will highlight the many ways you can continue to learn and share with your family, friends, and community. It will also explore actions you can take to support offshore wind, clean energy, and climate justice in your neighborhood and across the state. There are many ways to get involved.

As you explore how you can get involved in the future of offshore wind, it's important to know who all the players are. There are many organizations, government agencies, labor unions, and businesses who will bring offshore wind to life in New York. Let's get to know some of those groups to better understand the roles they play:

Government agencies are responsible for the legal and regulatory side of offshore wind. Developers must submit their plans to federal and state agencies for approval to ensure all regulations and requirements are followed.



Elected officials, such as city council representatives, state senate and assembly members, governors, and members of the US Senate and House of Representatives, play an important role in crafting policies that determine the future of clean energy and offshore wind in our communities.



Local businesses providing supplies, such as steel parts, and providing services, such as surveying, catering, or conducting environmental assessments, have opportunities to work with offshore wind projects.

Nonprofits focused on environmentalism and community development play a critical role in the development of offshore wind. They help ensure that government policies promote clean energy and reflect the interests of the communities they serve. Often, government agencies and developers consult with nonprofits throughout the planning and development processes.

Educational institutions will play a role in training the future offshore wind workforce. New York State has committed $20 million to help support local training programs across the State that will form a network called the Offshore Wind Training Institute.

Labor unions also play an important role in offshore wind development and job training. Many local unions, such as construction and welding unions, collaborate with local communities, government agencies, and developers to create training programs and workforce strategies such as apprenticeship and pre-apprenticeship programs that prepare their members for jobs in the offshore wind industry.

There's another major group of people getting involved in offshore wind, and that's **students like you!** Whether you are flying solo or connecting with a group, there are lots of things you can do to shape your clean energy future.

Taking action takes many forms

ENGAGE

PROMOTE

ACT

ENGAGE

Learn: By choosing to participate in OWYA, you've already made a commitment to learning about offshore wind.

Talk to your friends, family, classmates, teachers, and anyone else about what you learned in OWYA: Are any of your family members interested in the jobs created by offshore wind? Do your friends know that wind farms can be built in the ocean? Do they understand the urgency of climate change, and are they curious about solutions? They might be unaware of the benefits coming from offshore wind. Have a conversation with them about how offshore wind technology works, where projects are being built, what benefits everyone can expect to see, and why a just transition to clean energy matters.

Start or join a club at your school: Does your school have an environmental science or green technology club? Talk to the club members about how you can raise awareness for offshore wind and clean energy at your school. Is your school a Green Ribbon School? The Green Ribbon Schools award, run by the United States Department of Education, recognizes schools that have gone above and beyond to reduce their carbon footprint, save water and electricity, improve the health of the school community, and educate students about the environment and sustainability. The New York State Department of Education nominates individual schools and entire school districts for the Green Ribbon award. Talk to your teachers or principal about steps your school can take to become "greener," and make a plan to apply for the Green Ribbon award!

GO ONLINE

Learn more about nominating your school for the Green Ribbon award.

If your school doesn't have an environmental science or climate change action club, consider starting one! Speak to a teacher about gathering students to learn about climate change, clean energy, and the environment. You could be the first person to start a conversation about offshore wind in your school's history.

Credit: Van Tay Media

Post on social media: Raise awareness amongst friends, family, and classmates by posting what you learned on social media with #OWYA or sharing posts from the youth climate leaders, environmental groups, or clean energy news sources that you follow. Follow #OWYA on your favorite social media platforms and get to know your fellow participants across New York State.

Create your own offshore wind Instagram story or TikTok post (e.g., "Top 10 Things You Didn't Know About Offshore Wind" or "Top 5 Ways that Offshore Wind Will Rock Our World").

ACTIVITY: CREATE A MEETING AGENDA

Summary: Run effective meetings with your OWYA group, school club, or afterschool program by developing an agenda. Use the agenda to consider the goals, roles, and activities for your meeting and then use it to execute a fruitful experience with others.
Materials: Printed or digital agenda template
Prep Time: 10 min
Activity Time: 15 min

1. Print out the agenda template on page 96 or fill out the digital PDF version.
2. Share the agenda with your group prior to your meeting. You might want to assign the role of "notetaker" to someone in your group to enable you to focus on leading the meeting. Reflect on the meeting afterwards to continue to improve your facilitation skills.

PROMOTE

Join a local organization or participate in a local event: Who are the clean energy and climate leaders in your community? Are they hosting an Earth Day event or another day of action? Do they need volunteers or new team members? Finding the leaders and organizations who are already doing this important work in your community is key. See how you can help out, amplify their messages, and connect with other people who are working toward a clean energy future. Working collectively builds power to make important changes.

Organizations may have shared ideals but different missions. Are you interested in one focused on political action? What about conservation? Find an organization aligned to your values by asking:

- What is this organization's mission and vision?
- What does their prior work with communities look like?
- What has the organization accomplished in the past, and what are they currently working on?

GO ONLINE

Check out this list of environmental organizations across New York State or search the internet for "environmental organizations near me". Look back to our list of youth climate movements in Lesson 2. Sign up for their email lists to hear ways to learn more!

Participate in a community meeting: There are a number of ways you can get the word out about offshore wind to your community. Look for Community Board or City Council meetings in your area. Most of these meetings are open to the public, and you can submit your questions or statements to the council ahead of time. Are there any big construction projects underway in your community? Often, projects like building a new housing development, creating a new park, or building offshore wind infrastructure will have public meetings for local residents to learn about the project and voice any concerns they may have. Look for opportunities to show up and promote clean energy or climate justice.

Write to your elected officials: Write to your local leaders about the importance of clean energy or climate justice in your community. You can tell them about your vision for the future of your neighborhood. Do you want to see more clean energy jobs? Is there a source of pollution that needs to be addressed? Tell them about it!

ACTIVITY: WRITE TO YOUR REPRESENTATIVE

Summary: Write a letter to your state representatives encouraging them to support offshore wind.
Materials: Printed letter template or digital email template.
Prep Time: 10 min
Activity Time: 15 min

1. Print the template found on page 97 or copy the text from the letter into an email.
2. Visit the websites of the New York State Assembly and the New York State Senate. Type in your address to find your representative.
3. Visit your representative's website to find their mailing or email address.
4. Complete the letter template by filling in the blanks, or get creative and write your own message! Send your letter in the mail or by email.

Credit: OCG

ACT

Keep learning: Between YouTube videos, educational webinars, and industry events, there is an abundance of free resources available to learn more about offshore wind. Already thinking about next steps after graduation? You can pursue clean energy in college, complete relevant trainings, or secure technical certifications - there are many paths that lead to a future career in offshore wind. Schools across New York and the country are developing programs to support national and state clean energy targets. If you are interested in working in clean energy, consider taking classes in science, technology, engineering, or math (STEM).

Follow the projects: You can learn a lot more about offshore wind by following the progress of New York's offshore wind projects. For starters, sign up for NYSERDA's Offshore Wind email list. Look out for Open House events hosted by NYSERDA or an offshore wind developer, or attend a public hearing as part of the New York State permitting process– you can even give a statement expressing your views on offshore wind and the project.

Pursue a career in offshore wind: Seek out job training opportunities in your area. Connect with local union chapters to see if they are working on offshore wind projects, and ask how to get involved in their apprenticeship programs.

GO ONLINE

Check out upcoming webinars and events from NYSERDA and other offshore wind groups:

- **NYSERDA Offshore Wind**
- **The New York Offshore Wind Alliance**
- **The Business Network for Offshore Wind**

Building a career in offshore wind

By 2035, offshore wind is projected to create 10,000 jobs in New York State alone! These jobs will span a variety of sectors and require varying levels of education and specialized training. Workers in this industry will be at the forefront of transformative change for New York and for the whole world. These professionals are already working to make offshore wind for New York a reality. Learn more about them to see how varied offshore wind careers can be!

ALBA PEÑA
Community Engagement Manager
Equinor Wind US

"As a Community Engagement Manager at Equinor Wind US, I get the pleasure to work in collaboration with various community stakeholders across New York City, specifically the Brooklyn community. My work extends from educating our communities on our offshore wind developments to working with various institutions such as environmental, academic, and governmental; ensuring that as an organization, we remain within the confines of responsible development.

Growing up in underserved communities reinforced my passion for community work and development, and nothing excites me more than being able to work in the renewable energy sector with community, an industry filled with growth, opportunity and change.

JULIA PRINCE
Fisheries Liaison for Marin
Ørsted

"My job is to develop sincere relationships with individuals in the commercial fishing industry. I spend most of my time on fishing docks speaking to all types of individuals who are in, or connected to the fishing industry. The goal of my job is to better understand and help mitigate concerns about offshore wind. The best part of my job is being able to spend time outside meeting fishermen and helping the two industries coexist.

NSE ESEMA
Assistant Vice President, Smart & Sustainable Cities
New York City Economic Development Corporation

"I design and implement programmatic and strategic efforts to: catalyze emerging sectors, develop inclusive industry ecosystems, and advance equitable economic development. I am committed to designing and implementing strategies that support New York City in growing into a leading position in the burgeoning offshore wind landscape in the United States in a manner that ensures women, low-income populations and people of color equitably share in the benefits of the industry.

Can you picture yourself in one of these roles?

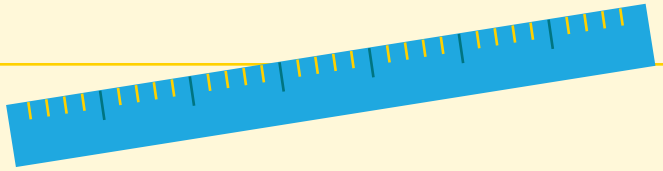
GO ONLINE **Review the Department of Energy's interactive Wind Career Map. Click on the different careers for more information about each one!**

MANUFACTURING

Manufacturing the components for offshore wind farms will create thousands of jobs in New York State and around the country. Creating these parts requires many inputs, from raw materials, such as those needed for steel turbine towers and concrete gravity-based foundations, to specialized technologies, such as hydraulic systems and electrical submarine cables. To find out if offshore wind manufacturing is happening near you, do a keyword search on the websites of your local news outlets or sources like offshorewind.biz and renews.biz. Big offshore wind manufacturing announcements often make headlines!

CONSTRUCTION

In New York, many of the construction jobs coming online will be for trade workers and assemblers. As you learned in Lesson 2, offshore wind components will be manufactured and pre-assembled at large port facilities before they are installed at project sites in the ocean. Upgrading New York's ports and electrical substations will require thousands of construction workers. Those workers will help build critical onshore and offshore infrastructure for offshore wind farms for decades to come.



SCIENCE AND ENGINEERING

Turning wind energy into electricity isn't possible without science and engineering. Electrical engineers, for example, work on transmitting the electricity generated out at sea to homes and businesses across the state, while mechanical engineers design more efficient turbines and advanced components. Environmental scientists, on the other hand, play an important role in planning offshore wind projects by conducting studies on ocean conditions and marine life so that wind farms can be built responsibly. Scientists and engineers are constantly making advancements in clean energy technology. Does this spark your curiosity? This path could be for you!

POLICY AND GOVERNMENT

Every offshore wind project requires interacting with government agencies on the local, state, and federal levels. A big part of making offshore wind a reality is acquiring permits to ensure that projects meet national and local regulations. This is one of the key areas where people with an interest in policy and government step in. Are you curious about how our state's laws, policies, and regulations shape the development of offshore wind farms?

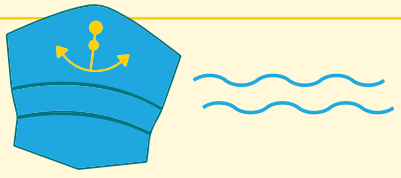
TECHNICIANS

Offshore wind turbine technicians support the final steps of developing turbines and maintain them out at sea. This is a job that requires specialized training because work conditions out in the ocean can be challenging, and you certainly can't be afraid of heights! Turbine technicians often work hundreds of feet in the air to maintain and repair turbine components. As of 2021, wind turbine technicians and solar panel installers are in the top three fastest growing jobs in the United States.[52] Check out this video of a day in the life of an offshore wind turbine technician to learn more about what it's like to work at sea.

STAKEHOLDER ENGAGEMENT

Throughout OWYA, we've mentioned many environmental and clean energy advocacy groups who have been working to make offshore wind and other climate solutions a reality for New York communities. Offshore wind developers need community input to build their projects efficiently and responsibly. Community-based organizations and elected officials are often at the forefront of this work, negotiating for benefits that their communities want to see from offshore wind projects. If you're interested in being a voice for your community in the clean energy transition, working for an advocacy organization or local government could be for you!

MARITIME PROFESSIONS



Have you ever dreamed of working at sea? Offshore wind will open opportunities in the maritime industry. Skilled boat captains, deckhands, and marine technicians will be needed for various activities out at sea, including gathering environmental and wildlife data, transporting and installing offshore wind farm components, and operating service crew vessels.

Construction workers often choose to be members of labor unions. **A union is an organized group of workers from the same field.** For example, your teacher might be part of a teacher's union, and your electrician may be part of an electrical workers union. Unions provide a support system for workers to negotiate for fair wages, safe working conditions, and benefits like retirement funds and healthcare. Unions are a great option for folks who are looking for quality jobs, valuable skills training, and would enjoy the physical work that goes into offshore wind development.

ACTIVITY: CLEAN ENERGY ROADMAP

Summary: Envision a clean energy future by filling out the action plan.
Materials: Printed roadmap templates
Prep Time: 10 min
Activity Time: 15 min

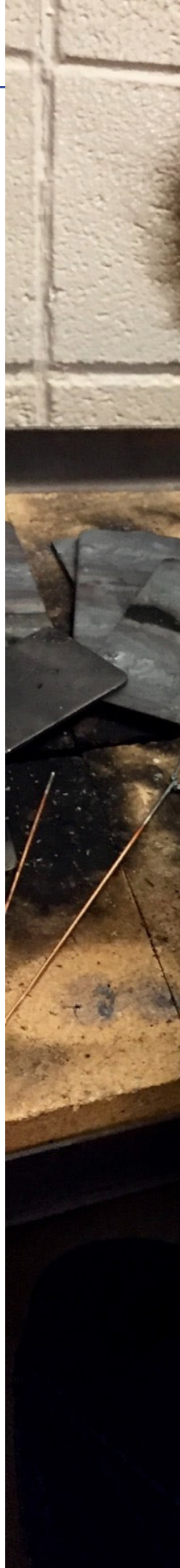
1. Print the clean energy roadmap template found on page 98-99.
2. Reflecting on what you've learned, fill out the template. Be as artistic and creative as you'd like! You can draw what a clean energy future looks like to you, or anything else clean energy represents.

You now know the many ways in which you can continue to be involved in offshore wind beyond OWYA. Whether it's educating your friends and family, getting involved with a local organization, or pursuing a career, there are many ways to be an active member of your clean energy future. Take some time to reflect on what you've learned and where you're going.

ACTIVITY: LESSON 3 KEY TAKEAWAYS

Summary: Reflect on what you've learned in Lesson 3 of OWYA by answering questions from the key takeaway flashcards.
Materials: Printed key takeaway flashcards
Prep Time: 10 min
Activity Time: 15 min

1. Print the key takeaway flashcard sheets found on page 100-101 (one set per pair of participants) utilizing the double-sided printing setting.
2. Cut the sheets into individual flashcards so the question is on one side and the answer is on the other.
3. Pair with another participant to review the key takeaways together. Alternatively, group leaders can ask these questions of the whole class to facilitate a wrap-up conversation.



Credit: Brandon Mowinkel

Credit: Li-An Lim

Review What You've Learned

Congratulations on completing OWYA! Page 77 of this lesson is a Certificate of Completion. This is proof of your participation in this program. Remember to add "NYSERDA Offshore Wind Youth Action Program Participant" to your college or professional resume! Let's take a moment to look back on what you've learned.

You learned:

- About actions you can take at school, with friends and family, and in your community to raise awareness about offshore wind and clean energy.
- About the different education and job opportunities that are available to you in the offshore wind field.
- That you have the chance to participate in a brand new industry that will help create a healthier future for all New Yorkers and everyone around the world.

You asked yourself:

- What can I do to support offshore wind or a clean energy transition in my community?
- How do I see myself getting involved?
- What are my hopes for the future?

Throughout OWYA you learned:

- What offshore wind is, how it works, and how it will interact with your community.
- The meaning of climate justice and a just transition, and how these goals are crucial for creating a better future for everyone.
- How New York State is leading the way in offshore wind development, and how you can be a part of it.


You
Did
It!


#NYSERDA
NYSERDA
NEW YORK
STATE OF OPPORTUNITY

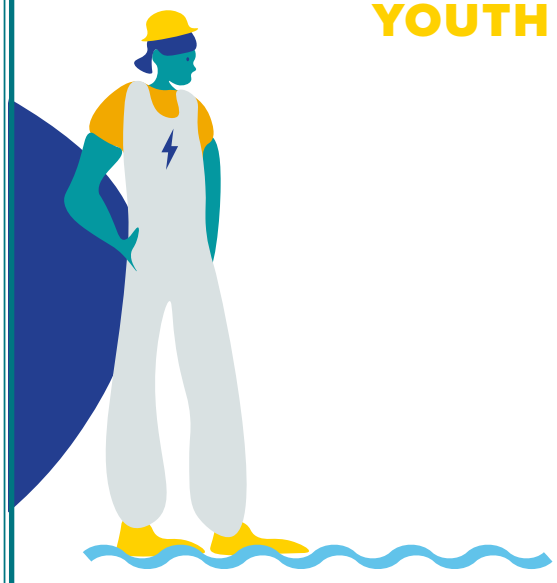
CERTIFICATE OF COMPLETION

Proudly presented to:

_____

In recognition of their successful completion of the

NYSERDA OFFSHORE WIND YOUTH ACTION PROGRAM



Activity materials

CLEAN ENERGY: TRUE OR FALSE FLASH CARDS | SIDE 1

TRUE OR FALSE: THE FIRST OFFSHORE WIND FARM EVER CONSTRUCTED WAS BUILT OFF THE COAST OF RHODE ISLAND.

TRUE OR FALSE: MORE AMERICANS WORK IN THE RENEWABLE ENERGY INDUSTRY THAN THE NON-RENEWABLE ENERGY INDUSTRY.

TRUE OR FALSE: RENEWABLE ENERGY HAS NO IMPACT ON THE ENVIRONMENT.

TRUE OR FALSE: OFFSHORE WIND ENERGY TRAVELS BACK TO LAND THROUGH ELECTRICAL CABLES BURIED UNDER THE OCEAN FLOOR.

TRUE OR FALSE: RENEWABLE RESOURCES ARE PROJECTED TO SURPASS COAL AS THE LARGEST SOURCE OF ELECTRICITY AROUND THE WORLD BY 2025.

TRUE OR FALSE: LIGHTING USES THE GREATEST AMOUNT OF ELECTRICITY IN HOMES ACROSS THE US.

CLEAN ENERGY: TRUE OR FALSE FLASH CARDS | SIDE 2

FALSE

Rhode Island is home to the first US-based offshore wind farm, the Block Island Wind Farm, constructed in 2015. However, the first offshore wind farm in the world was built in 1991 in Denmark. This project was called the Vindeby Wind Farm, and after 25 years of service, it was decommissioned in 2017.

TRUE

In 2019, there were three Americans working in renewable energy compared to every one American working in the fossil fuel industry. Nearly 335,000 people work in the solar industry and more than 111,000 work in the wind industry. In comparison, 211,000 work in coal mining or other fossil fuel extraction.[53]

FALSE

Every source of energy will have some impact on the environment. However, renewable resources have a much smaller impact. While some emissions are produced during manufacturing and transporting wind and solar infrastructure, the emissions saved from generating clean energy outweigh the emissions that come from the manufacturing and transporting of infrastructure.[54]

TRUE

Cables carry electricity beneath the ocean floor all the way to the offshore substation. From there, the electricity passes through the export cable to an onshore substation, and eventually, to networks of power lines and power stations that convert and deliver it to consumers.

TRUE

While coal usage has been declining for many years in the United States and Europe, other countries like China still rely heavily upon it for electricity. However, renewable energy production has been accelerating faster than coal production in recent years, and renewable resources are expected to surpass coal by 2025.

FALSE

Space heating uses the most energy in an average home, accounting for 43% of total energy usage. Lighting, on average, accounts for 21% of energy usage.

SITE PLANNING: STAKEHOLDER CHARACTER CARDS

COMMERCIAL FISHERMAN

You are a fourth-generation commercial fisherman. Your family has lived on Long Island since the early 1900s and makes their living fishing for Atlantic herring, a small silver fish that can be eaten or sold for bait. This was once a very profitable fishery, but in recent years, the population has suffered due to fisheries management issues, overfishing, and because climate change has made ocean waters warmer. Your family and community has strong ties to the ocean and to this fishery, but it's become increasingly difficult to make a living. Now, an offshore wind developer wants to build an offshore wind farm off the Northeastern coast of the United States. You are concerned that this will further stress the Atlantic herring population, disrupt their habitat, and intrude on the ocean space your family has been fishing for decades. **You believe that we should transition to clean energy like terrestrial wind or solar but not offshore wind. You need to ensure that your fishing areas and the herring population aren't disrupted.**

TOURISM OPERATOR

You run a recreational fishing charter boat out of Staten Island. You make your living from taking tourists out on the water to go fishing. Your favorite fishing sites are the subway cars that the City of New York sunk off the coast in the early 2000s to create artificial reefs. Fish gather at these sites because they provide additional locations for food and protection from the open ocean. Your customers always catch lots of fish at these locations. You've heard about how offshore wind turbines also create artificial reefs over time, and that operators in Rhode Island have seen an increase in business since the Block Island Wind Farm was built. You know New York is planning to develop offshore wind and hope to expand your business to accommodate both fishing and sightseeing tours out to the wind farms once they are built. **You support offshore wind and are excited about the additional possibilities it presents for your business.**

MARINE MAMMAL CONSERVATIONIST

You are a marine biologist who specializes in dolphin and whale conservation. You study the different dolphin and whale species found off the coast of New York, when and where they migrate, and how they are impacted by boat traffic and ocean noise. Because New York has one of the busiest ports in the country, there are already a lot of vessels traveling to and from New York Harbor. You are concerned that offshore wind development vessel traffic will increase the risk of ships striking marine mammals and that construction will add to the human-caused noise in the water, which can disrupt the animals' abilities to find food and communicate with one another. You are also concerned that offshore wind farms may be built along important migration routes, which could affect the behavior of the dolphins and whales and their health and mortality. At the same time, you know that climate change is a huge threat to all marine life, and you know that we must reduce carbon emissions soon to protect the entire ocean ecosystem. **You support offshore wind but need to make sure that disturbances to dolphin and whale populations are minimized and mitigated throughout the process.**

SITE PLANNING: STAKEHOLDER CHARACTER CARDS

MARINER

You are a mariner who operates large vessels that move cargo such as cars and grain around the world. Your shipping route often takes you through the New York area and down the east coast to the Port of Miami. You are aware that states from Maine to South Carolina are beginning to plan for offshore wind development. You have lived the majority of your life at sea and love that your job takes you around the world. You're concerned about how large-scale offshore wind development might impact navigational safety. If wind turbines are built in shipping lanes, mariners will have to create different routes that might add time to journeys and have wider impacts on trade and the global economy. **You're okay with offshore wind as long as it doesn't interrupt your shipping routes.**

COASTAL HOMEOWNER

You are a life-long resident of New York City. You recently retired and fulfilled your dream of buying a home on the beach. You live in the Rockaways and love to walk along the boardwalk and look out at the ocean. It reminds you of your childhood when you used to visit Rockaway Beach with your family during the summer. You have seen pictures of giant offshore wind turbines and are concerned about how close to shore they will be built because the wind farm could impact the view from the boardwalk or the value of your home. However, since living in the Rockaways, you've had to buy flood insurance for your home, and you've already experienced several sunny-day floods that prevented you from leaving the house. You're well aware that climate change and sea level rise will cause more flooding in your neighborhood and support taking action to stop climate change. **You and your neighbors want to make sure you are included in any planning about offshore wind, so developers can address your concerns and make an agreement that works for your community.**

OFFSHORE WIND DEVELOPER

You work for an offshore wind developer based in Europe. Your company has built many offshore wind farms across the world, but this will be your first project in the United States. For your offshore wind project to make money, you need to build the wind farm in an area with strong winds, and the larger the project area, the more money you can make. You plan to use turbine technology that can be built in waters 30-60 meters deep. You know that introducing such a large, new technology could impact other ocean users, and you are committed to working with stakeholders to address their concerns about the proposed offshore wind project if it is sited in an area that conflicts with their interests. **You are excited about this industry's potential to fight climate change and create well-paying jobs, but you know that not everyone feels similarly.**

SITE PLANNING: STAKEHOLDER CHARACTER CARDS

OCEAN PLANNER

You are in charge of choosing a location for a new offshore wind project off the coast of New York. As the leader of the planning process, your goal is to understand the needs of different stakeholder groups and make an informed decision about where to site the offshore wind project. You have organized this planning meeting to gather local knowledge and insights from stakeholders. **You must do your best to consider everyone's concerns and meet their needs before selecting an area for the project.**

MILITARY OFFICER

You are representing the US military. The military conducts important activities out at sea and has strict guidelines designed to protect the safety of our military personnel and our national security that inform where offshore wind development can take place. You are at the table to ensure that the proposed offshore wind farm will not be built in areas that are strictly off-limits due to military activities. **You are fine with offshore wind as long as it is sited in areas deemed suitable by the military.**

SITE PLANNING: NEGOTIATION WORKSHEET

Character: _____

What is most important to your character in this negotiation?

1.

2.

3.

What is your character most concerned about when it comes to offshore wind development?

1.

2.

3.

What are some options that you can present to your fellow stakeholders that would meet your interests and enable an offshore wind farm to be built?

1.

2.

3.

If you can't reach a compromise in the negotiations, what are some alternative actions you could take to meet your own interests?

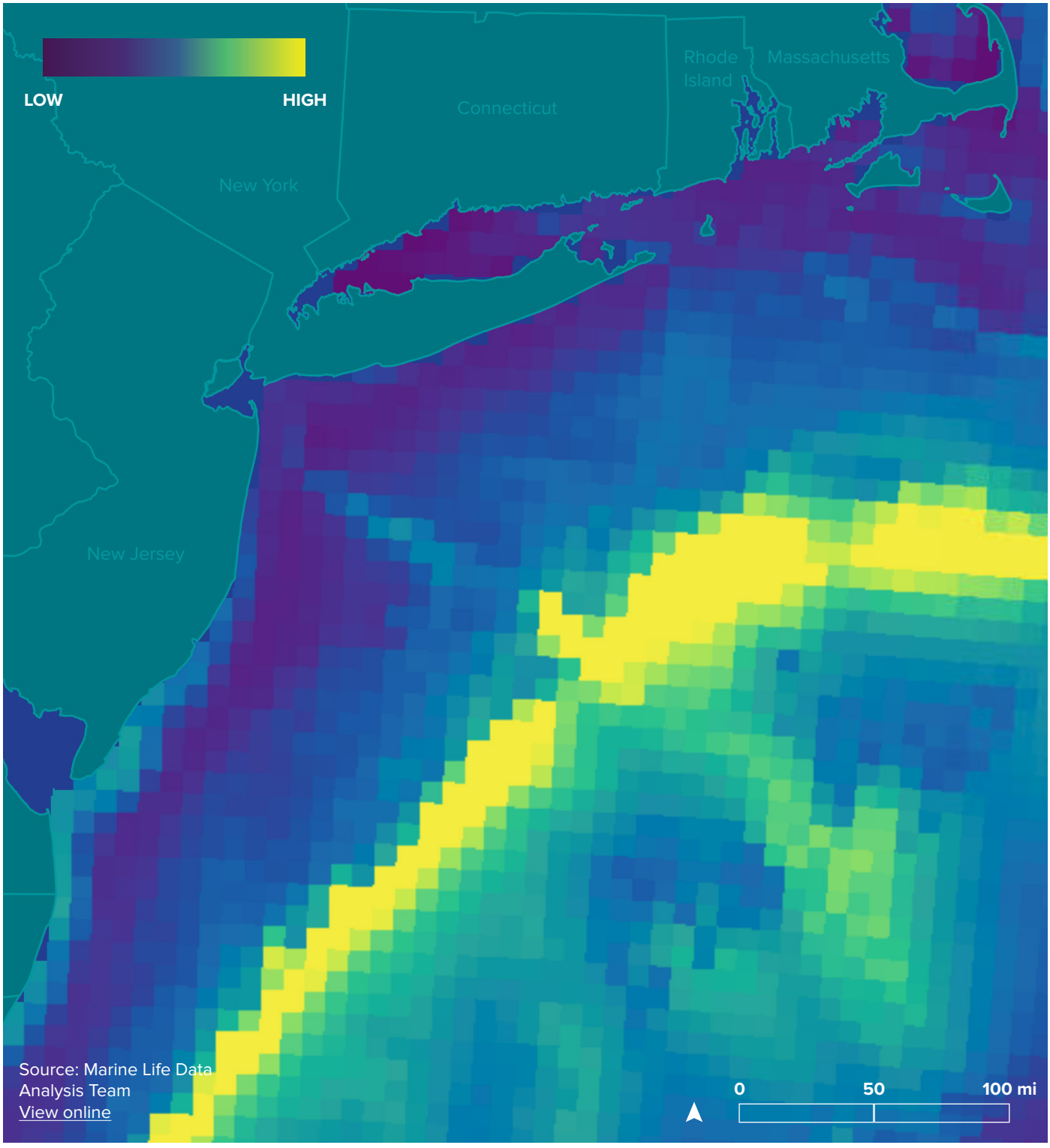
1.

2.

3.

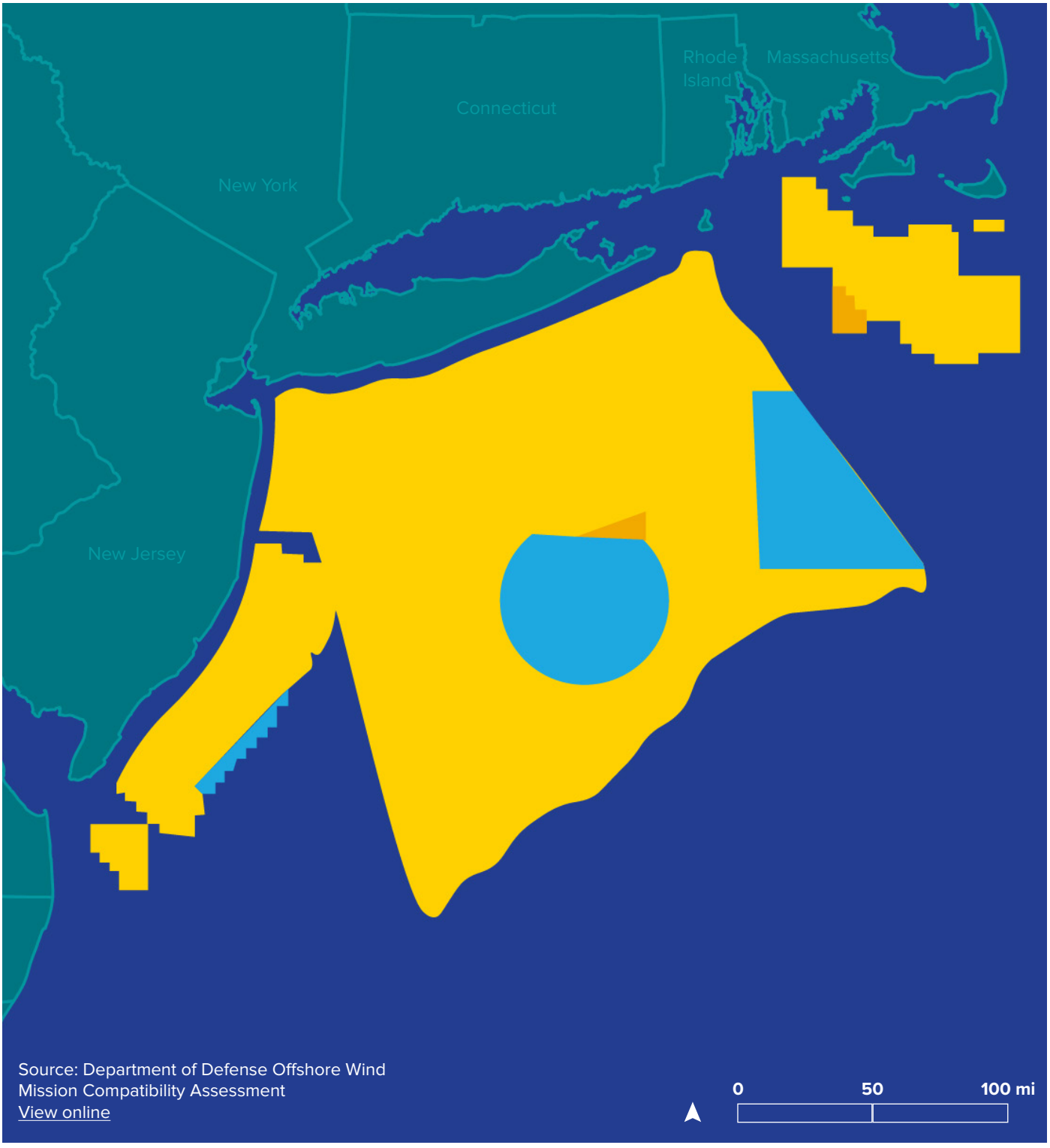
SITE PLANNING: MARINE MAMMAL ABUNDANCE MAP

This map shows where marine mammals (whales and dolphins) are most commonly found along the New York coast. Notice that the yellow indicates areas with the most marine mammals. These are primarily migration routes. The darker blue indicates areas with fewer marine mammals. Keep in mind that these animals are not restricted to these areas and often travel great distances.



SITE PLANNING: DEPARTMENT OF DEFENSE ZONES MAP

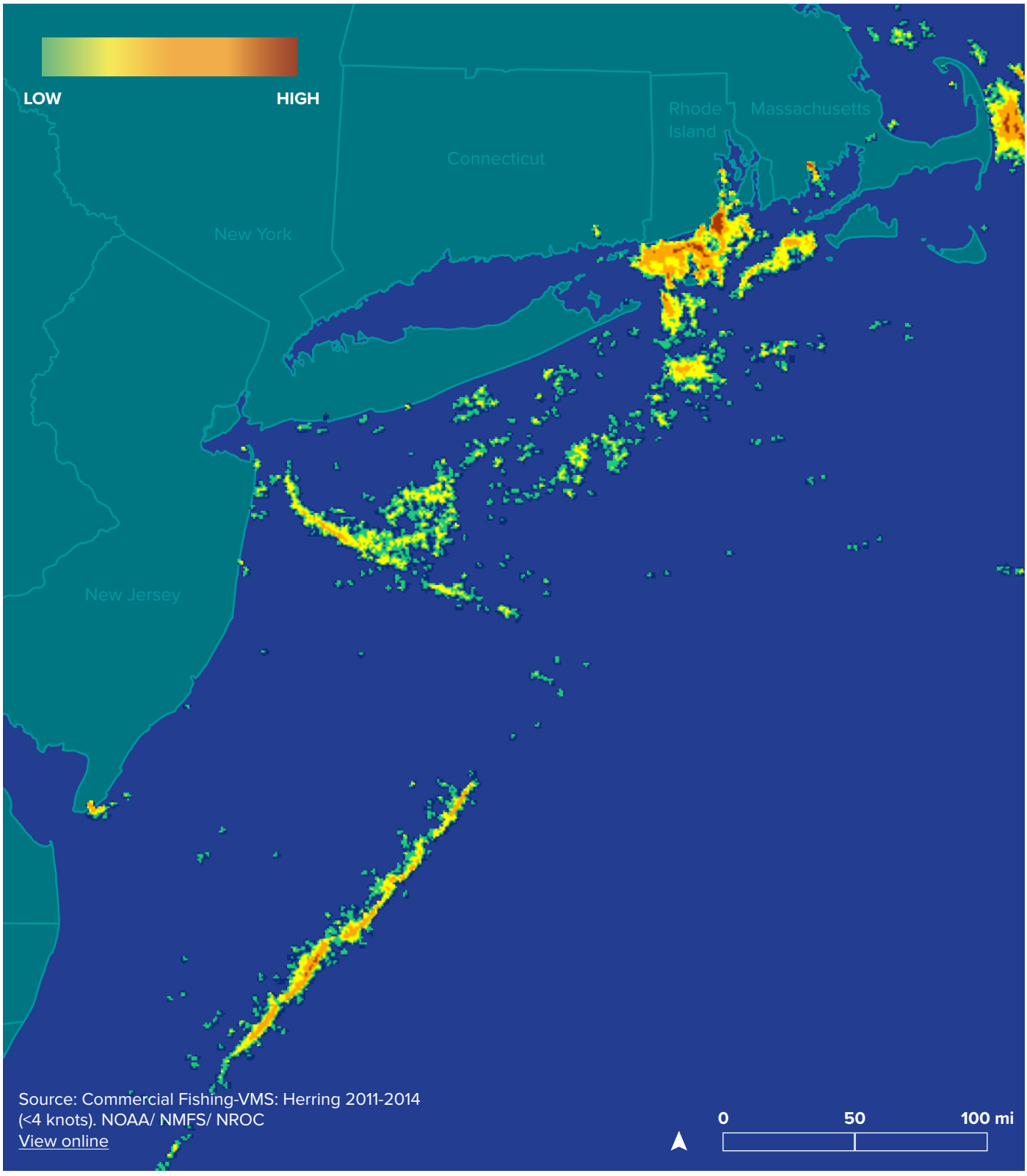
This map shows the areas that have been identified as suitable or unsuitable for offshore wind development by the United States Department of Defense. Light blue means no offshore wind development can occur due to interference with military activities. Dark yellow are areas that do not interfere with military activities, and light yellow means that offshore wind can be developed, as long as certain conditions are met.



Source: Department of Defense Offshore Wind Mission Compatibility Assessment
View online

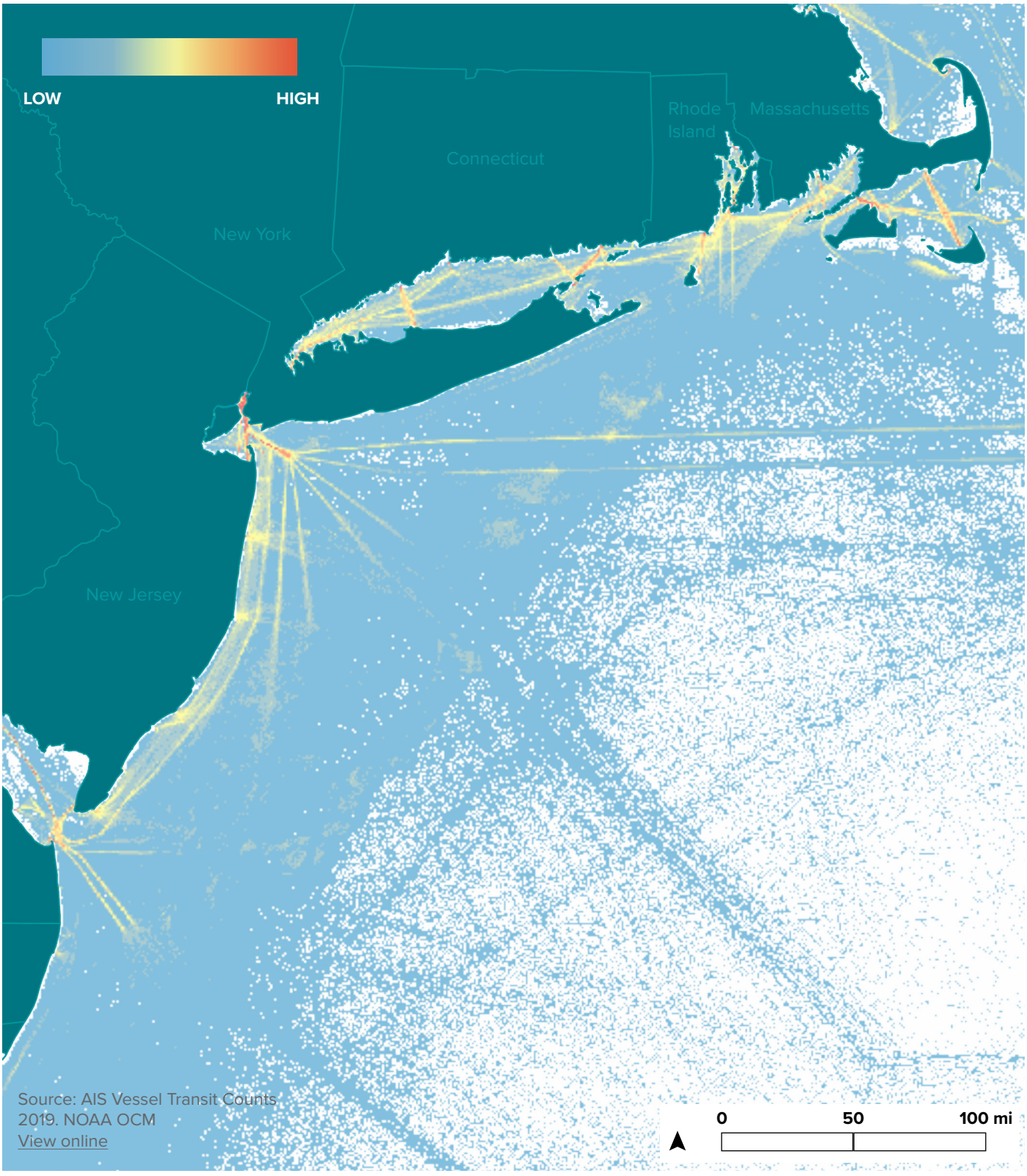
SITE PLANNING: HERRING FISHING MAP

This map shows areas where herring are commonly fished. Green indicates areas where fewer herring are caught, while red indicates where more herring are found. Yellow is somewhere in between.



SITE PLANNING: VESSEL ROUTES MAP

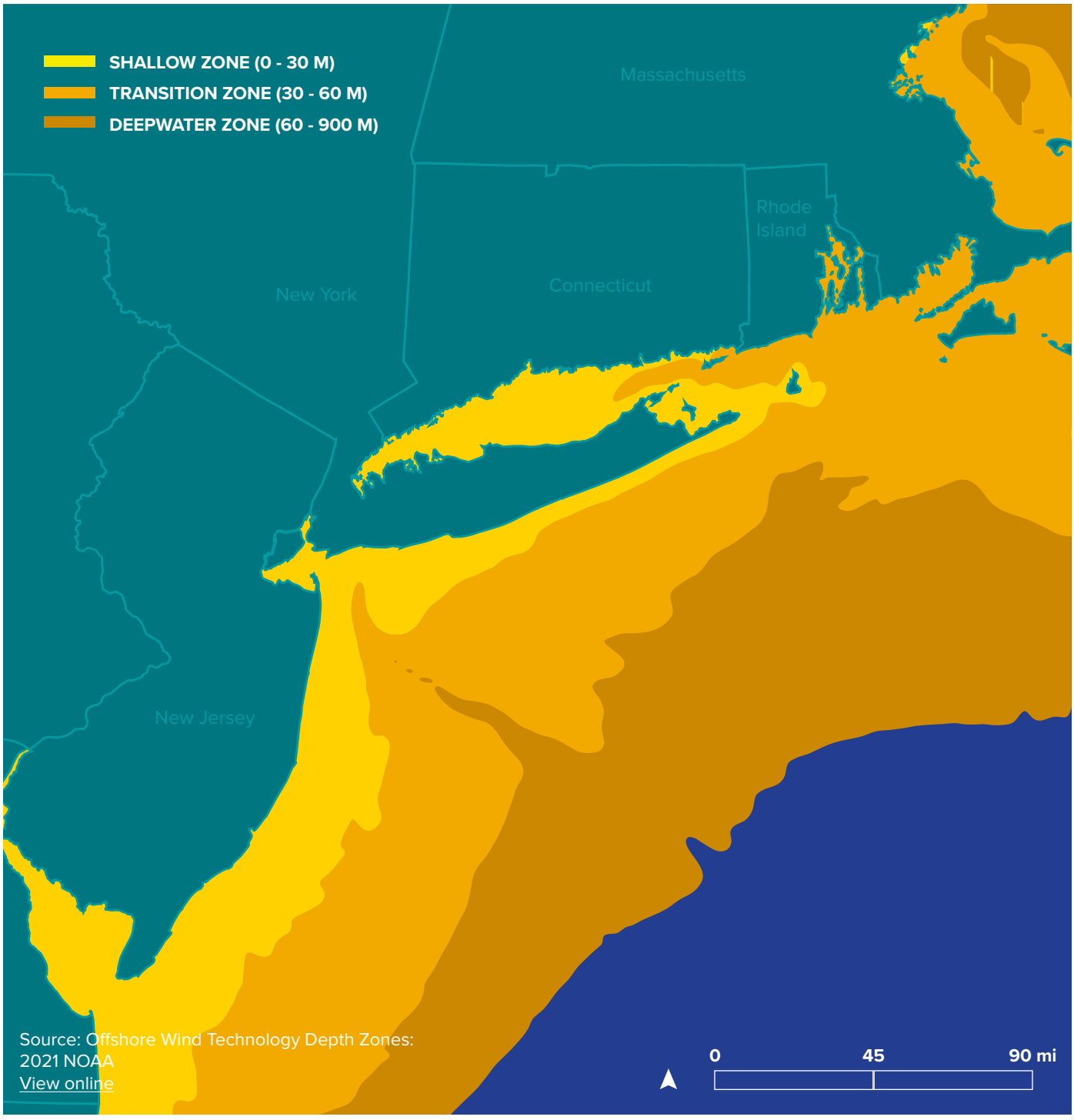
This map represents transit tracks of all vessels in 2019. Blue lines represent all vessel tracks, while yellow and red lines show the shipping lanes with higher traffic.



Source: AIS Vessel Transit Counts 2019. NOAA OCM
View online

SITE PLANNING: OFFSHORE WIND TECHNOLOGY DEPTH ZONES

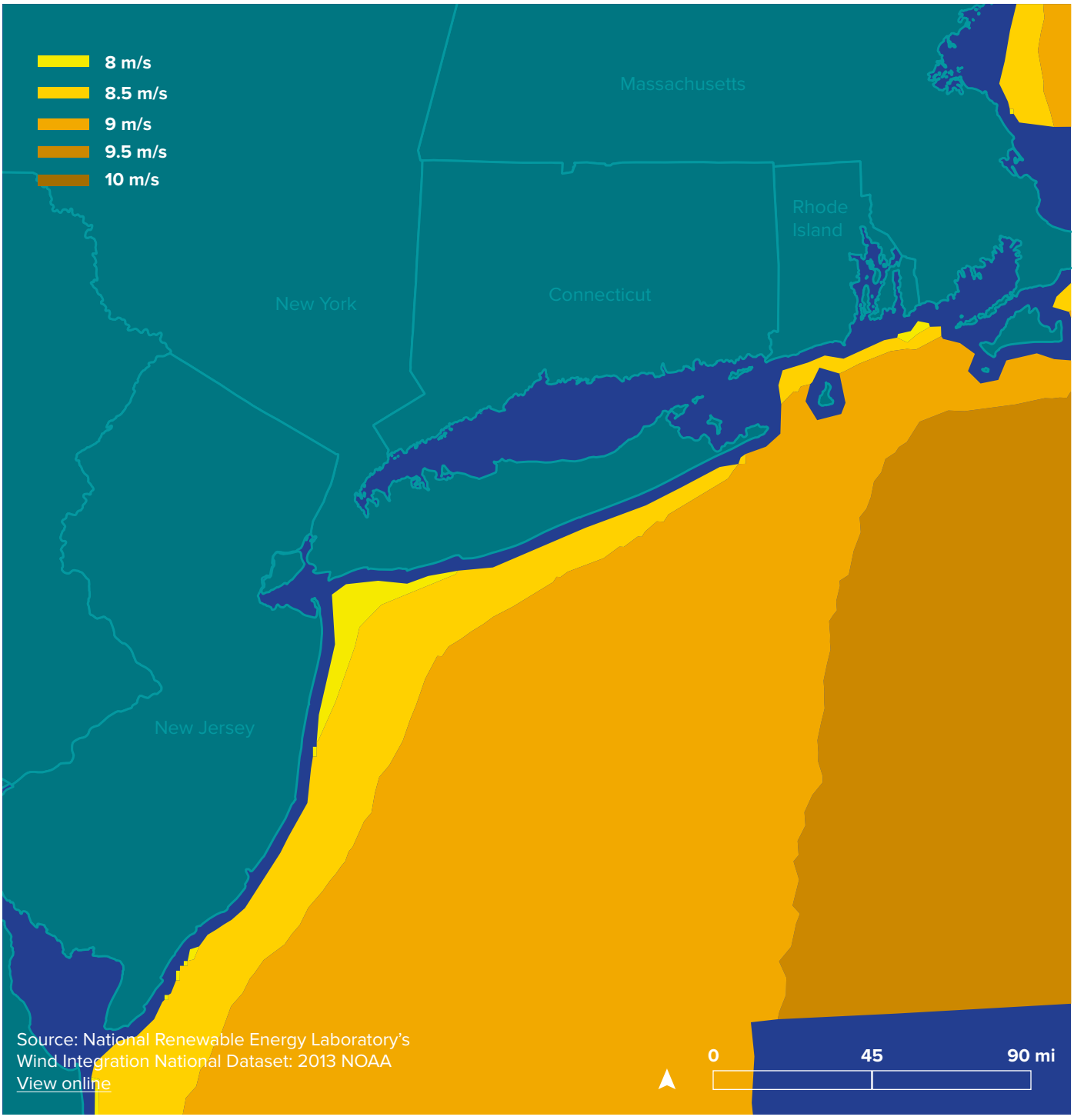
This map shows areas where offshore wind technology can be built, according to the National Oceanic and Atmospheric Administration (NOAA). Offshore wind technology can be developed in the shallow zone with foundation types including monopole, gravity base, and suction buckets. It's possible to build offshore wind farms in the transition zone, but it hasn't yet been proven on a commercial scale. Finally, there are several pilot projects in the deepwater zone, with foundation types including spar, semi-submersible, and tension leg platform designs.



Source: Offshore Wind Technology Depth Zones: 2021 NOAA
View online

SITE PLANNING: ATLANTIC OFFSHORE WIND RESOURCE POTENTIAL

This map shows average wind speeds at meters per second (m/s) at 100 meters above seal level. The stronger the winds, the higher the potential for energy production.



Source: National Renewable Energy Laboratory's Wind Integration National Dataset: 2013 NOAA
View online

LESSON 1 KEY TAKEAWAYS: FLASH CARDS | SIDE 1

WHAT IS THE GREENHOUSE EFFECT AND HOW DOES IT INFLUENCE CLIMATE CHANGE?

WHAT ARE THE BENEFITS OF SWITCHING TO RENEWABLE ENERGY SOURCES FROM NON-RENEWABLE ONES?

HOW DOES CLIMATE CHANGE IMPACT DIFFERENT COMMUNITIES ACROSS NEW YORK STATE?

HOW DO OFFSHORE WIND TURBINES CAPTURE WIND POWER AND BRING IT TO OUR ELECTRICITY GRID?

WHAT ARE SOME OF THE DIFFERENT WAYS IN WHICH THE OCEAN IS USED AS A RESOURCE?

LESSON 1 KEY TAKEAWAYS: FLASH CARDS | SIDE 2

The greenhouse effect is the heat-trapping process that **drives climate change**. Greenhouse gases such as carbon dioxide and methane are emitted into the earth's atmosphere and **trap heat from the sun**, warming the entire planet.

a. Switching to renewable energy will **reduce greenhouse gas emissions** and help combat climate change.
b. Switching to renewable energy will **reduce harmful air and water pollutants** that impact human and environmental health.
c. Switching to renewable energy will **avoid damages to the environment and harm to wildlife** associated with extracting fossil fuels from below the earth's surface.
d. Switching to renewable energy will **create thousands of new jobs and bring billions of dollars** to New York communities.

a. Coastal communities will see **more flooding and saltwater intrusion.**
b. Agricultural communities will see **shifting growing seasons** or changes in the types of crops that can be grown.
c. We will all see **bigger and more frequent storms.**
d. We will all experience **hotter days that can trigger chronic health issues**, like asthma, or lead to other heat-related illnesses.

Wind power turns the **turbines blades**. The **generator** within the **hub** of the turbine converts the mechanical energy of the wind to electrical energy, which passes through **underwater cables** to an **offshore substation**. The substation collects the energy from the wind turbines and, through another underwater cable, sends the electricity to an onshore substation on land. From there, the electricity is distributed to the **grid** that connects to our homes, schools, and businesses.

a. **Habitat:** The Atlantic Ocean off the coast of New York is home to many marine species, from deep-sea corals to endangered whales.
b. **Fishing:** Commercial fishing provides seafood and supports livelihoods.
c. **Shipping:** Shipping corridors allow access to the busy trade centers along the east coast, providing safe transit lanes for cargo ships carrying goods from around the world.
d. **Recreation:** many people, like recreational fishermen, boaters, surfers, and divers, use the ocean for fun and enjoyment.
e. **Tourism:** The ocean supports tourism businesses, such as whale watching and charter fishing trips.

LESSON 2 KEY TAKEAWAYS: FLASH CARDS | SIDE 1

WHAT KINDS OF ECONOMIC BENEFITS WILL OFFSHORE WIND PROVIDE?

WHAT IS MEANT BY THE TERM "JUST TRANSITION"?

WHAT ARE SOME OF THE GOALS OF NEW YORK'S CLIMATE ACT?

HOW DO ENVIRONMENTAL HAZARDS AND CLIMATE IMPACTS AFFECT COMMUNITIES DIFFERENTLY?

HOW DOES OFFSHORE WIND TIE INTO CLIMATE JUSTICE?

LESSON 2 KEY TAKEAWAYS: FLASH CARDS | SIDE 2

In addition to a cleaner environment, offshore wind can provide economic benefits to communities through **job creation, revitalization of manufacturing facilities and ports, and increased tourism activity.**

A just transition is the idea that shifting to renewable energy should not only reduce negative environmental and health impacts, but should also **bring positive impacts, like new jobs, to communities that have experienced the greatest environmental and health consequences** from industrial pollution, fossil fuel energy facilities, and climate change.

The Climate Act commits New York to getting **70% of our electricity from renewable sources by 2030, 100% zero-emissions electricity by 2040, installing 9,000 MW of offshore wind by 2035,** and, importantly, requires a goal of **40% of the benefits from all climate and clean energy investments go to disadvantaged communities.**

Environmental hazards like fossil fuel power plants and other **polluting industries** are often located in low-income communities and communities of color. Climate impacts like **sea level rise and hurricanes** regularly have the harshest effects on these communities because they are often located in the most vulnerable areas.

Offshore wind can support climate justice in communities overburdened with environmental hazards and climate impacts by **providing jobs and economic benefits** to those communities and **enabling the transition away from fossil fuel power generation.**

CREATE A MEETING AGENDA: TEMPLATE

MEETING TOPIC:	
Date	
Timeframe	
Meeting purpose	
Meeting leader	
Notetaker	
Number of attendees	

Time *(e.g. 10 min)*	**Discussion item/activity**
	Welcome and introductions
	Discussion item/activity #1 • • •
	Discussion item/activity #2 • • •
	Discussion item/activity #3 • • •
	Next steps and assignment of tasks
	Wrap up

Meeting reflections	What went well? What could have been smoother? What changes would you make for the next meeting?

WRITE YOUR REPRESENTATIVE: TEMPLATE

_____
[Day/Month/Year]

Dear _____,
[Representative name]

My name is _____. I live in _____, New York.
[Your name] **[Hometown]**

I am a student at _____. I recently participated in NYSERDA's Offshore Wind Youth Action
[Your school]
(OWYA) program, where I learned about all the opportunities that offshore wind has to offer New York State.

I am writing to you today to encourage you to support legislation that will further offshore wind development in New York. Offshore wind is projected to create 10,000 jobs for New Yorkers across the State and will play a crucial role in combating climate change. My own community could benefit from offshore wind through

_____. New York has already
[Maritime jobs / manufacturing jobs / transitioning away from fossil fuel plants]
committed to developing 9,000 MW of offshore wind energy by 2035. This ambitious commitment will require policy and program development in the coming years to meet the education, workforce, and supply chain needs of the offshore wind industry.

Through OWYA, I also learned about environmental justice and the importance of a just transition to a clean energy future. Offshore wind presents an opportunity to build upon the climate justice initiatives of New York's Climate Leadership and Community Protection Act (CLCPA). In accordance with the CLCPA, I encourage you to support further legislation that promotes equity and justice in New York's clean energy transition.

Thank you for working towards a healthier future for all New Yorkers.

Sincerely,

_____
[Your signature]

CLEAN ENERGY ROADMAP

Reflect on what you've learned through OWYA. Write down 3-5 main takeaways:

1.
2.
3.
4.
5.

Make a wishlist for the future: What changes do you want to see in your community? In your own life? In the country? In the world? Write down whatever comes to mind, no vision is too bold!

Think of some action steps that you can take to help make these goals a reality:

1.
2.
3.

Draw a diagram, sketch, or collage inspired by the ideas and goals you've set forth:

LESSON 3 KEY TAKEAWAYS: FLASH CARDS | SIDE 1

WHO ARE SOME OF THE STAKEHOLDERS INVOLVED IN BRINGING OFFSHORE WIND TO NEW YORK?

WHAT ARE SOME OPTIONS YOU HAVE FOR CONTINUING TO ENGAGE IN OFFSHORE WIND BEYOND OWYA?

WHAT ARE THREE THINGS YOU SHOULD CONSIDER WHEN JOINING AN ORGANIZATION?

WHAT KIND OF JOBS MIGHT BE CREATED OR UTILIZED THROUGH OFFSHORE WIND DEVELOPMENT?

LESSON 3 KEY TAKEAWAYS: FLASH CARDS | SIDE 2

Government agencies, elected officials, local businesses, nonprofit organizations, educational institutions, labor unions

Talking to friends and family, joining a club at school or a local organization, participating in a community meeting, writing to your elected officials, pursuing a clean energy education or career.

a. The organization's **mission**
b. Examples of their **prior community work**
c. The organization's **past accomplishments and current focus**

Manufacturing, construction, science and engineering, policy and government, technicians, stakeholder engagement, maritime.

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